MHI

Manual No. ’03-M-T-078

**TECHNICAL MANUAL**

**Collection data**

# MULTI-TYPE PACKAGED AIR-CONDITIONER

## (Split system, Air to air heat pump type)

## (OUTDOOR UNIT)
## FDCP808HES3, FDCP1008HES3

## (INDOOR UNIT)
## FDT208, 258, 308, 408, 508
## FDR208, 258, 308, 408, 508
## FDUR208, 258, 308, 408, 508

MITSUBISHI HEAVY INDUSTRIES, LTD.

# CONTENTS


1. GENERAL INFORMATION ..... 1
   1.1 Specific features ..... 1
   1.2 How to read the model name ..... 1
   1.3 Table of models ..... 2
   1.4 Table of system combinations ..... 2
2. SELECTION DATA ..... 3
   2.1 Specifications ..... 3
   2.2 Range of usage & limitations ..... 12
   2.3 Exterior dimensions ..... 14
   2.4 Exterior appearance ..... 27
   2.5 Piping system ..... 28
   2.6 Selection chart ..... 30
   2.7 Characteristic of fan ..... 32
   2.8 Noise level ..... 35
3. ELECTRICAL DATA ..... 38
   3.1 Electrical wiring ..... 38
4. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER ..... 40
5. APPLICATION DATA ..... 52
   5.1 Installation of indoor unit ..... 53
   5.2 Installation of remote controller (Optional parts) ..... 69
   5.3 Installation of outdoor unit ..... 70
6. MAINTENANCE DATA ..... 78
   6.1 Servicing ..... 78
   6.2 Trouble shooting for refrigerant circuit ..... 79
   6.3 Diagnosing of microcomputer circuit ..... 80

# 1 GENERAL INFORMATION

## 1.1 Specific features

Ideal for the installation conditions characteristic of larger rooms and L-shaped or other non-standard-shaped rooms, the Multi-Type V series allows an extensive degree of flexibility in the selection of indoor units. Specifically, the selection of indoor units with differing capacities and differing or similar types is supported, as is the selection of indoor units with similar capacities and differing types. Furthermore, a maximum of up to four individual indoor units can be operated in synchrony with a single outdoor unit.

(1) Simaltaneous operation possible in non-standard-shaped rooms or large-sized areas.

(2) Select indoor units of differing capacities and differing or similar types; alternatively, indoor units of similar capacities and differing types.

(3) Up to four individual indoor units can be connected to single outdoor unit.

(4) Indoor unit.

**(i) Ceiling recessed type (FDT)**

(a) All air supply ports have auto swing louvers. The indoor fan motor has two speeds of high and low.

**(b) 700mm high drain head**

Adoption of drain pump with high drain head and high capacity (600cc/min) has made it possible to have maximum 700 mm(from below ceiling drain head.[In case 700mm drain head is required, set it up close to the unit. It is impossible to do piping on down slope.]

**(ii) Cassetteria type (FDR)**

**(a) 2 types of optional decorative panel**

1) Optional decorative panel consists of silent panel and a canvas duct panel. [has smaller sizes and is prepared with canvas duct panel which provides higher drain head.]

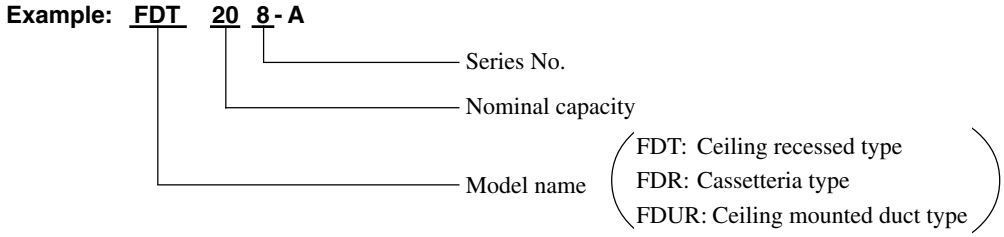
2) Flexibility of installation is increased with 2 type panels.

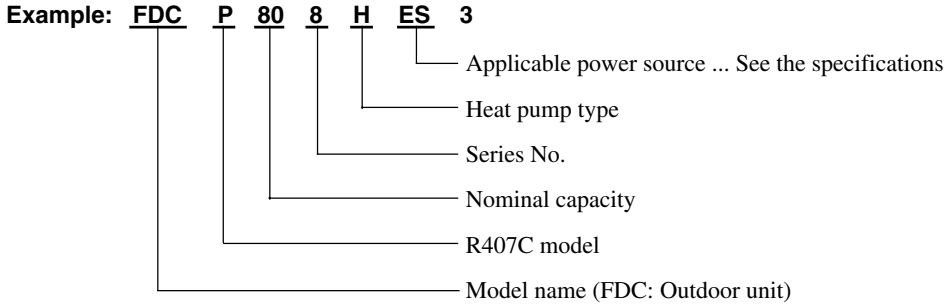
**(iii) Ceiling mounted duct type (FDUR)**

**(a) The position of the suction port can be changed.**

The suction from the lower inlet is available by replacing the duct connecting section (at the side face) and the lower plate. (They are changed on site.)

## 1.2 How to read the model name





Example: FDC P 80 8 H ES 3
Applicable power source ... See the specifications
Heat pump type
Series No.
Nominal capacity
R407C model
Model name (FDC: Outdoor unit)

## 1.3 Table of models

| Model \ Capacity | 208 | 258 | 308 | 408 | 508 |
|---|---|---|---|---|---|
| **Ceiling recessed type (FDT)** | ○ | ○ | ○ | ○ | ○ |
| **Cassetteria type (FDR)** | ○ | ○ | ○ | ○ | ○ |
| **Ceiling mounted duct type (FDUR)** | ○ | ○ | ○ | ○ | ○ |
| **Outdoor unit to be combined(FDC)** | FDCP808HES3 (8 Horse Power) | | FDCP1008HES3 (10 Horse Power) | | |

## 1.4 Table of system combinations

| Outdoor unit | Type | Indoor unit assembly capacity | Branch pipe set (Optional) |
|---|---|---|---|
| **FDCP808HES3** | Twin | 408+408 | DIS-WB |
| | | 308+508 | |
| | Triple | 308+308+308 | DIS-TB |
| | Double twin | 208+208+208+208 | DIS-WA×2set<br>DIS-WB×1set |
| **FDCP1008HES3** | Twin | 508+508 | DIS-WB |
| | Triple | 208+408+408 | DIS-TB |
| | | 258+258+508 | |
| | | 308+308+408 | |
| | Double twin | 258+258+258+258 | DIS-WA×2set<br>DIS-WB×1set |

Notes (1) It is possible to used different models (FDT, FDR, FDUR) when combining indoor units.
(2) Always use the branch piping set (optional) at branches in the refrigerant piping.

# 2 SELECTION DATA

## 2.1 Specifications

### (1) Indoor unit

#### (a) Ceiling recessed type (FDT)

**Models FDT208-A, 258-A**

| Item \ Model | | FDT208-A | FDT258-A |
|---|---|---|---|
| **Nominal cooling capacity(1)** | **W** | **5000** | **5700** |
| **Nominal heating capacity(1)** | **W** | **5400** | **6100** |
| **Power source** | | **1 Phase 220/240V 50Hz** | |
| Noise level | dB(A) | Hi: 38 Lo: 33 | Hi: 39 Lo: 35 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **Unit:215 × 700 × 700 Panel:26 × 800 × 800** | **Unit:260 × 840 × 840 Panel:30 × 950 × 950** |
| **Net weight** | **kg** | **23(Unit:18 Panel:5)** | **30(Unit:24 Panel:6)** |
| Refrigerant equipment Heat exchanger | | Louver fine & inner grooved tubing | |
| Refrigerant control | | Capillary tube | |
| Air handling equipment Fan type & Q'ty | | Turbo fan × 1 | |
| **Motor** | **W** | **30×1** | **25×1** |
| Starting method | | Line starting | |
| **Air flow(Standard)** | **CMM** | **Hi: 14 Lo: 10** | **Hi: 16 Lo: 11** |
| Fresh air intake | | Available | |
| Air filter, Q'ty | | Long life filter × 1(Washable) | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-S-E)** | |
| Room temperature control | | Thermostat by electronics | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line: ϕ6.35 (1/4") Gas line: ϕ15.88 (5/8")** | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")** |
| **Connecting method** | | **Flare piping** | |
| Drain hose | | Connectable with VP25 | |
| Insulation for piping | | Necessary (both Liquid & Gas line) | |
| **Accessories** | | **Mounting kit, Drain hose** | |
| **Optional parts** | | **Decorative Panel** | |

Notes (1) The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

| Model \ Item | Panel Part No. |
|---|---|
| FDT208-A | T-PSA-22W-E |
| FDT258-A | T-PSA-32W-E |

## Models FDT308-A, 408-A, 508-A

| Item \ Model | | FDT308-A | FDT408-A | FDT508-A |
|---|---|---|---|---|
| **Nominal cooling capacity(1)** | **W** | **7100** | **10000** | **12500** |
| **Nominal heating capacity(1)** | **W** | **8000** | **11200** | **14000** |
| **Power source** | | **1 Phase 220/240V 50Hz** | | |
| Noise level | dB(A) | Hi: 41 Lo: 35 | Hi: 48 Lo: 40 | Hi: 49 Lo: 43 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **Unit:260 ×840 ×840 Panel:30 × 950 × 950** | **Unit:320 ×840 ×840 Panel:30 × 950 × 950** | |
| **Net weight** | **kg** | **30(Unit:24 Panel:6)** | **34(Unit:28 Panel:6)** | **36(Unit:30 Panel:6)** |
| Refrigerant equipment Heat exchanger | | Louver fine & inner grooved tubing | | |
| Refrigerant control | | Capillary tube | | |
| Air handling equipment Fan type & Q'ty | | Turbo fan × 1 | | |
| **Motor** | **W** | **30×1** | **80×1** | **130×1** |
| Starting method | | Line starting | | |
| **Air flow(Standard)** | **CMM** | **Hi: 17 Lo: 12** | **Hi: 26 Lo: 19** | **Hi: 28 Lo: 20** |
| Fresh air intake | | Available | | |
| Air filter, Q'ty | | Long life filter × 1(Washable) | | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-S-E)** | | |
| Room temperature control | | Thermostat by electronics | | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")** | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ19.05 (3/4")** | |
| **Connecting method** | | **Flare piping** | | |
| Drain hose | | Connectable with VP25 | | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | | |
| **Accessories** | | **Mounting kit, Drain hose** | | |
| **Optional parts** | | **Decorative Panel** | | |

Notes (1) The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

| Item / Model | Panel Part No. |
|---|---|
| FDT308-A, 408-A, 508-A | T-PSA-32W-E |

## (b) Cassetteria type (FDR)

### Models FDR208-A, 258-A

| Item \ Model | | FDR208-A | | FDR258-A | |
|---|---|---|---|---|---|
| **Decorative panel** | | **Silent panel** | **Canvas panel** | **Silent panel** | **Canvas panel** |
| **Panel model (Option)** | | **R-PNLS-26W-E** | **R-PNLC-26W-E** | **R-PNLS-36W-E** | **R-PNLC-36W-E** |
| **Nominal cooling capacity(1)** | **W** | **5000** | | **5700** | |
| **Nominal heating capacity(1)** | **W** | **5400** | | **6100** | |
| **Power source** | | **1 Phase 220/240V 50Hz** | | | |
| Noise level | dB(A) | Hi: 43 Lo: 37 | Hi: 44 Lo: 38 | Hi: 43 Lo: 37 | Hi: 44 Lo: 38 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **Unit:355 × 750 ×635 Panel:10 × 1040 ×750** | **Unit:(299+α) × 750 ×635 Panel:10 × 864 × 585** | **Unit:355 × 950 ×635 Panel:10 × 1240 ×750** | **Unit:(299+α) × 950 ×635 Panel:10 × 1064 × 585** |
| **Net weight** | **kg** | **Unit:30 Panel:7** | **Unit:30 Panel:5** | **Unit:35 Panel:8** | **Unit:35 Panel:6** |
| Refrigerant equipment Heat exchanger | | Louver fins & inner grooved tubing | | | |
| Refrigerant control | | Capillary tube | | | |
| Air handling equipment Fan type & Q'ty | | Multiblade centrifugal fan×2 | | | |
| **Motor** | **W** | **55×1** | | **90×1** | |
| Starting method | | Line starting | | | |
| **Air flow(Standard)** | **CMM** | **Hi: 14 Lo: 11** | | **Hi: 18 Lo: 14** | |
| **Available static pressure** | **Pa** | **Standard:50, High:85** | | **Standard:45, High:80** | |
| Fresh air intake | | Available | | | |
| Air filter Q'ty | | Polypropylene net ×2(Washable) | | | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | | | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-E)** | | | |
| Room temperature control | | Thermostat by electronics | | | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | | | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line: ϕ6.35 (1/4") Gas line: ϕ15.88 (5/8")** | | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")** | |
| **Connecting method** | | **Flare piping** | | | |
| Drain hose | | Connectable with VP25 | | | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | | | |
| **Accessories** | | **Mounting kit, Drain hose** | | | |
| **Optional parts** | | **Silent panel, Canvas panel, Canvas duct** | | | |

Notes (1)The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01503

(4)Add the canvas duct lenght to the unit height for the canvas type.

## Models FDR308-A, 408-A

| Item \ Model | | FDR308-A | | FDR408-A | |
|---|---|---|---|---|---|
| **Decorative panel** | | **Silent panel** | **Canvas panel** | **Silent panel** | **Canvas panel** |
| **Panel model (Option)** | | **R-PNLS-36W-E** | **R-PNLC-36W-E** | **R-PNLS-46W-E** | **R-PNLC-46W-E** |
| **Nominal cooling capacity(1)** | **W** | **7100** | | **10000** | |
| **Nominal heating capacity(1)** | **W** | **8000** | | **11200** | |
| **Power source** | | **1 Phase 220/240V 50Hz** | | | |
| Noise level | dB(A) | Hi: 44 Lo: 38 | Hi: 45 Lo: 39 | Hi:45 Lo: 38 | Hi: 46 Lo: 39 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **Unit:355 × 950 ×635 Panel:10 × 1240 ×750** | **Unit:(299+α) × 950 ×635 Panel:10 × 1064 × 585** | **Unit:406 × 1370× 635 Panel:10 × 1660 ×750** | **Unit:(350+α) × 1370× 635 Panel:10 ×1484 ×585** |
| **Net weight** | **kg** | **Unit:35 Panel:8** | **Unit:35 Panel:6** | **Unit:50 Panel:9** | **Unit:50 Panel:7** |
| Refrigerant equipment Heat exchanger | | Louver fins & inner grooved tubing | | | |
| Refrigerant control | | Capillary tube | | | |
| Air handling equipment Fan type & Q'ty | | Multiblade centrifugal fan × 2 | | Multiblade centrifugal fan × 3 | |
| **Motor** | **W** | **100 ×1** | | **45 ×1+90 ×1** | |
| Starting method | | Line starting | | | |
| **Air flow(Standard)** | **CMM** | **Hi: 20 Lo: 15** | | **Hi: 28 Lo: 22** | |
| **Available static pressure** | **Pa** | **Standard:45, High:80** | | **Standard:50, High:80** | |
| Fresh air intake | | Available | | | |
| Air filter Q'ty | | Polypropylene net×2(Washable) | | Polypropylene net×3(Washable) | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | | | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-E)** | | | |
| Room temperature control | | Thermostat by electronics | | | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | | | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line:ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")** | | **Liquid line:ϕ9.52 (3/8") Gas line: ϕ19.05 (3/4")** | |
| **Connecting method** | | **Flare piping** | | | |
| Drain hose | | Connectable with VP25 | | | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | | | |
| **Accessories** | | **Mounting kit, Drain hose** | | | |
| **Optional parts** | | **Silent panel, Canvas panel, Canvas duct** | | | |

Notes (1)The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01503

(4)Add the canvas duct lenght to the unit height for the canvas type.

## Model FDR508-A

| Item \ Model | | FDR508-A | |
|---|---|---|---|
| **Decorative panel** | | **Silent panel** | **Canvas panel** |
| **Panel model (Option)** | | **R-PNLS-46W-E** | **R-PNLC-46W-E** |
| **Nominal cooling capacity(1)** | **W** | **12500** | |
| **Nominal heating capacity(1)** | **W** | **14000** | |
| **Power source** | | **1 Phase 220/240V 50Hz** | |
| Noise level | dB(A) | Hi: 46 Lo: 39 | Hi: 47 Lo: 40 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **Unit:406 × 1370 × 635 Panel:10 × 1660 × 750** | **Unit:(350+α) × 1370 × 635 Panel:10 × 1484 × 585** |
| **Net weight** | **kg** | **Unit:52 Panel:9** | **Unit:52 Panel:7** |
| Refrigerant equipment Heat exchanger | | Louver fins & inner grooved tubing | |
| Refrigerant control | | Capillary tube | |
| Air handling equipment Fan type & Q'ty | | Multiblade centrifugal fan × 3 | |
| **Motor** | **W** | **50 × 1+100 × 1** | |
| Starting method | | Line starting | |
| **Air flow(Standard)** | **CMM** | **Hi: 34 Lo: 27** | |
| **Available static pressure** | **Pa** | **Standard:50, Hi speed:80** | |
| Fresh air intake | | Available | |
| Air filter Q'ty | | Polypropylene net ×3(Washable) | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-E)** | |
| Room temperature control | | Thermostat by electronics | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line:ϕ9.52 (3/8") Gas line:ϕ19.05 (3/4")** | |
| **Connecting method** | | **Flare piping** | |
| Drain hose | | Connectable with VP25 | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | |
| **Accessories** | | **Mounting kit, Drain hose** | |
| **Optional parts** | | **Silent panel, Canvas panel, Canvas duct** | |

Notes (1)The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

(3)Canvas panel is used in combination with following canvas duct
Canvas duct: HA01484

(4)Add the canvas duct lenght to the unit height for the canvas type.

### (c) Ceiling mounted duct type (FDUR)

### Models FDUR208-A, 258-A

| Item \ Model | | FDUR208-A | FDUR258-A |
|---|---|---|---|
| **Nominal cooling capacity(1)** | **W** | **5000** | **5700** |
| **Nominal heating capacity(1)** | **W** | **5400** | **6100** |
| **Power source** | | **1 Phase 220/240V 50Hz** | |
| Noise level | dB(A) | Hi: 40 Lo: 36 | Hi: 41 Lo: 37 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **295 × 850 × 650** | |
| **Net weight** | **kg** | **39** | **40** |
| Refrigerant equipment Heat exchanger | | Louver fins & inner grooved tubing | |
| Refrigerant control | | Capillary tube | |
| Air handling equipment Fan type & Q'ty | | Multiblade centrifugal fan × 2 | |
| **Motor** | **W** | **90 × 1** | **130 × 1** |
| Starting method | | Line starting | |
| **Air flow(Standard)** | **CMM** | **Hi: 17 Lo: 13.5** | **Hi: 21 Lo: 17** |
| **Available static pressure** | **Pa** | **Standard:50, Max:85** | |
| Fresh air intake | | — | |
| Air filter Q'ty | | Polypropylene net × 1(Washable) | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-E)** | |
| Room temperature control | | Thermostat by electronics | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line: ϕ6.35 (1/4") Gas line: ϕ15.88 (5/8")** | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")** |
| **Connecting method** | | **Flare piping** | |
| Drain hose | | Connectable with VP25 | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | |
| **Accessories** | | **Mounting kit, Drain hose** | |
| **Optional parts** | | **Silent panel** | |

Notes (1)The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2)This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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●Silent Panel model (Optional)

| Item / Model | Panel Part No. | Color |
|---|---|---|
| FDUR208-A, 258-A | UR-PS-27W-E | Ceramic white |

## Models FDUR308-A, 408-A, 508-A

| Item \ Model | | FDUR308-A | FDUR408-A | FDUR508-A |
|---|---|---|---|---|
| **Nominal cooling capacity(1)** | **W** | **7100** | **10000** | **12500** |
| **Nominal heating capacity(1)** | **W** | **8000** | **11200** | **14000** |
| **Power source** | | **1 Phase 220/240V 50Hz** | | |
| Noise level | dB(A) | Hi: 41 Lo: 37 | Hi: 44 Lo: 40 | Hi: 45 Lo: 41 |
| **Exterior dimensions Height × Width × Depth** | **mm** | **295 × 850 × 650** | **350 × 1370 × 650** | |
| **Net weight** | **kg** | **40** | **63** | **65** |
| Refrigerant equipment Heat exchanger | | Louver fine & inner grooved tubing | | |
| Refrigerant control | | Capillary tube | | |
| Air handling equipment Fan type & Q'ty | | Multiblade centrifugal fan × 1 | | |
| **Motor** | **W** | **230×1** | **280×1** | **460×1** |
| Starting method | | Line starting | | |
| **Air flow(Standard)** | **CMM** | **Hi: 25 Lo: 20** | **Hi: 34 Lo: 27** | **Hi: 42 Lo: 33.5** |
| **Available static pressure** | **Pa** | **Standard: 50, Max: 130** | | |
| Fresh air intake | | — | | |
| Air filter, Q'ty | | Polypropylene net × 1(Washable) | | |
| Shock & vibration absorber | | Rubber sleeve(for fan motor) | | |
| Operation control Operation switch | | **Remote control switch (Optional:RCD-H-E)** | | |
| Room temperature control | | Thermostat by electronics | | |
| Safety equipment | | Internal thermostat for fan motor. Frost protection thermostat | | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")** | **Liquid line: ϕ9.52 (3/8") Gas line: ϕ19.05 (3/4")** | |
| **Connecting method** | | **Flare piping** | | |
| Drain hose | | Connectable with VP25 | | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | | |
| **Accessories** | | **Mounting kit, Drain hose** | | |
| **Optional parts** | | **Silent Panel** | | |

Notes (1) The data are measured at the following conditions.

| Item / Operation | Indoor air temperature | | Outdoor air temperature | | Standards |
|---|---|---|---|---|---|
| | DB | WB | DB | WB | |
| Cooling | 27℃ | 19℃ | 35℃ | 24℃ | ISO-T1,JIS B8616 |
| Heating | 20℃ | — | 7℃ | 6℃ | |

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

●Silent Panel model (Optional)

| Item / Model | Panel Part No. | Color |
|---|---|---|
| FDUR308-A | UR-PS-27W-E | Ceramic white |
| FDUR408-A, 508-A | UR-PS-47W-E | |

## (2) Outdoor unit

### Models FDCP808HES3, 1008HES3

| Item \ Model | | FDCP808HES3 | FDCP1008HES3 |
|---|---|---|---|
| **Power source** | | **3 Phase 380/415V 50Hz** | |
| **Nominal cooling capacity(1)** | **W** | **20000** | **25000** |
| **Nominal heating capacity(1)** | **W** | **22400** | **28000** |
| Noise level | dB(A) | 58 | |
| **Exterior dimensions Height × Width × Depth** | **mm** | **1450 × 1350 × 600** | |
| **Net weight** | **kg** | **195** | **205** |
| Refrigerant equipment compressor type & Q' ty | | CB90H × 1 | CB125H × 1 |
| **Motor** | **kW** | **6.5** | **9.0** |
| Starting method | | Line starting | |
| Crankcase heater | W | 70 | |
| Heat exchanger | | Slitted fines & bare tubing | |
| Refrigerant control | | Capillary tube | |
| **Refrigerant** | | **R407C** | |
| **Quantity** | **kg** | **4.95(Pre-charged up to the piping length of 5m)** | **7.1(Pre-charged up to the piping length of 5m)** |
| **Refrigerant oil** | ℓ | **4.4 (MA32R)** | |
| Defrost control | | MC controlled De-Icer | |
| Air handling equipment Fan type & Q'ty | | Propeller fan × 2 | |
| **Motor** | **W** | **100×2** | |
| Starting method | | Line starting | |
| **Air flow(Standard)** | **CMM** | **180** | |
| Shock & vibration absorber | | Rubber mount (for compressor) | |
| Safety equipment | | Internal thermostat for fan motor.<br>High pressure protection switch | |
| **Installation data Refrigerant piping size** | **mm(in)** | **Liquid line: ϕ12.7 (1/2")<br>Gas line: ϕ25.4 (1")** | **Liquid line: ϕ15.88 (5/8")<br>Gas line: ϕ28.58 (11/8")** |
| **Connecting method** | | **Liquid line: Flare piping Gas line: Brazing** | |
| Drain | | Hole for drain(ϕ20 × 8pcs, ϕ50 × 1pcs) | |
| Insulation for piping | | Necessary (both Liquid & Gas lines) | |
| **Accessories** | | – | |

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-T1.

(2) The refrigerant quantity in the connecting pipe is not included Charge it additionally at the site.

### (3) Operation chart

Regarding the operation characteristics of the twin unit of the same model and with the same capacity, please refer to the nameplate on the equipment.

For any other combinations (Twin, triple or double-twin of different models and different capacities), please calculate based on the following operaion characteristics. (See page 12.)

#### (a) Operating characteristic of outdoor unit

(380 V/415 V)

| Item \ Model | | FDCP808HES3 | FDCP1008HES3 |
|---|---|---|---|
| Cooling input | kW | 8.20/8.38 | 12.36/12.42 |
| Heating input | | 7.78/7.86 | 11.22/11.43 |
| Cooling running current | A | 13.3/13.5 | 19.8/18.9 |
| Heating running current | | 12.6/12.8 | 18.6/17.9 |
| Inrush current (L.R.A) | A | 99 | 154 |
| Cooling power factor | % | 94/86 | 95/91 |
| Heating power factor | | 94/85 | 92/89 |

Note (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

#### (b) Operating characteristic of indoor unit

**FDT Series**

(220 V/240 V)

| Item \ Model | FDT Series | | | | |
|---|---|---|---|---|---|
| | 208-A | 258-A | 308-A | 408-A | 508-A |
| Power input (kW) | 0.10/0.11 | | 0.11/0.12 | 0.21/0.21 | 0.27/0.27 |
| Running current (A) | 0.5/0.5 | | 0.6/0.6 | 1.2/1.2 | 1.4/1.4 |

**FDR Series**

(220 V/240 V)

| Item \ Model | FDR Series | | | | |
|---|---|---|---|---|---|
| | 208-A | 258-A | 308-A | 408-A | 508-A |
| Power input (kW) | 0.10/0.11 | 0.11/0.12 | 0.15/0.16 | 0.19/0.19 | 0.24/0.24 |
| Running current (A) | 0.5/0.5 | | 0.7/0.7 | 0.9/0.9 | 1.2/1.2 |

**FDUR Series**

(220 V/240 V)

| Item \ Model | FDUR Series | | | | |
|---|---|---|---|---|---|
| | 208-A | 258-A | 308-A | 408-A | 508-A |
| Power input (kW) | 0.18/0.19 | 0.20/0.22 | 0.23/0.24 | 0.33/0.37 | 0.40/0.45 |
| Running current (A) | 0.9/0.9 | 1.0/1.0 | 1.1/1.3 | 1.5/1.7 | 1.8/2.0 |

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"
(2) The values shown in the above table are common to both cooling and heating operations.

#### (c) Calculation of total operation characteristics

Since the operation characteristics of series Multi depend on combination of indoor unit, calculate the total operation characteristics of the system by using the formulas below according to specifications of each indoor unit or outdoor unit.

**1) Total power input**

Total power input (kW) = Power input of outdoor unit + $\sum$ (Power input of indoor unit)

**2) Total running current**

Total running current (A) = Running current of outdoor unit + [$\sum$ (Running current of indoor unit) $\times$ 2/3]

### 3) Total power factor

Total power factor (%) = [Total power input (W) / $\sqrt{3}$ × Total running current (A) × Power source] × 100

Total operation characteristics = Operation characteristic value of outdoor unit + Operation characteristic value of indoor unit

[Example]

(Conditions) Operation Voltage ····· Indoor unit: 220 V, 50 Hz
Outdoor unit: 380 V, 50 Hz
Operation mode ····· Cooling and Heating
Unit····· Outdoor unit: FDCP808HES3 × 1 unit
Indoor unit: FDUR308-A × 1 units, FDT508-A × 1 units

**Operation characteristics of each unit** (Cooling/Heating)

| Item \ Model | FDCP808HES3 | FDUR308-A | FDT508-A |
|---|---|---|---|
| Power input (kW) | 8.20/7.78 | 0.23/0.23 | 0.27/0.27 |
| Running current (A) | 13.8/12.6 | 1.1/1.1 | 1.4/1.4 |

① Total power input (kW)

(Cooling) 8.20 + 0.23+ 0.27 = 8.70 (kW)

(Heating) 7.78 + 0.23+ 0.27 = 8.28 (kW)

② Total running current (A)

(Cooling) $13.3 + (1.1+1.4 \times \frac{2}{3}) \fallingdotseq 15.0$ (A)

(Heating) $12.6 + (1.1 + 1.4 \times \frac{2}{3}) \fallingdotseq 14.3$ (A)

③ Total power factor (%)

(Cooling) $\frac{8.70 \times 1000}{\sqrt{3} \times 15.0 \times 380} \times 100 \fallingdotseq 88$ %

(Heating) $\frac{8.28 \times 1000}{\sqrt{3} \times 14.3 \times 380} \times 100 \fallingdotseq 88$ %

## 2.2 Range of usage & limitations

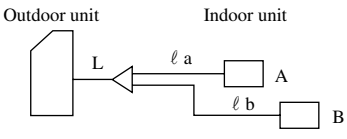
| Item \ Model | FDCP808HES3 | FDCP1008HES3 |
|---|---|---|
| **Indoor return air temperature (Upper, lower limits)** | Refer to the selection chart | |
| **Outdoor air temperature (Upper, lower limits)** | | |
| **Indoor unit atmosphere (behind ceiling) temperature and humidity** | Dew point temperature: 28˚C or less, relative humidity: 80% or less | |
| **Refrigerant line (one way) length** | Max. 50m(1) | |
| **Vertical height difference between outdoor unit and indoor unit** | Max. 30m (Outdoor unit is higher)<br>Max. 15m (Outdoor unit is lower) | |
| **Difference in height between indoor units** | Max. 4m | |
| **Power source voltage** | Rating ± 10% | |
| **Voltage at starting** | Min. 85% of rating | |
| **Frequency of ON-OFF cycle** | Max. 10 times/h | |
| **ON and OFF interval** | Max. 3 minutes | |

Note (1) Refer to the next page for details of common pipe length.

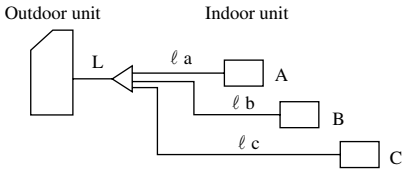
## Height and length restrictions for refrigerant piping

### Model FDCP808, 1008HES3

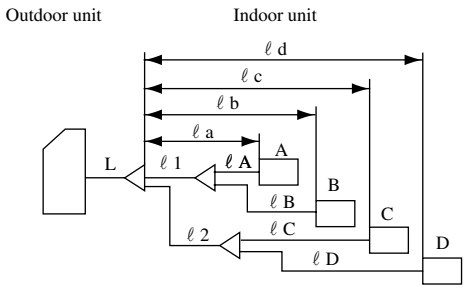
(Twin type)




(Triple type)




(Double-twin type)




In the illustration the L is main piping and ℓ a, ℓ b, ℓ c, and ℓ d are branch piping.

- One-way pipe length (m) $L+\ell a \leqq 50, L+\ell b \leqq 50, L+\ell c \leqq 50, L+\ell d \leqq 50$
- Branch pipe length (m) $|\ell a-\ell b| \leqq 10, |\ell a-\ell c| \leqq 10, |\ell b-\ell c| \leqq 10$
  $|\ell a-\ell d| \leqq 10, |\ell b-\ell d| \leqq 10, |\ell c-\ell d| \leqq 10$
  $\ell a \leqq 30, \ell b \leqq 30, \ell c \leqq 30, \ell d \leqq 30$
  $\ell A+\ell B \leqq 15, \ell C+\ell D \leqq 15$
- Vertical height difference between outdoor unit and indoor unit
  Outdoor unit is higher Max. 30m
  Outdoor unit is lower Max. 15m
- Difference in higher between indoor units Max. 4m

**Request**

(1) When the capacity of the indoor unit to be connected is 208 or less, be sure to use a pipe diameter of ø9.52 for the size of the liquid piping of branch piping (between branch and indoor units). (for twin, triple, and double-twin only) For connections to indoor units (liquid piping side dai. ø6.35) use the different diameter adapter coupling that is included in the branch piping kit.

(2) For the branch be sure to select the specified branch pipe set (sold separately) and then to follow the directions of the instruction manual included in the branch pipe set when installing the piping. Be sure to install the branch piping so that the branch is level.

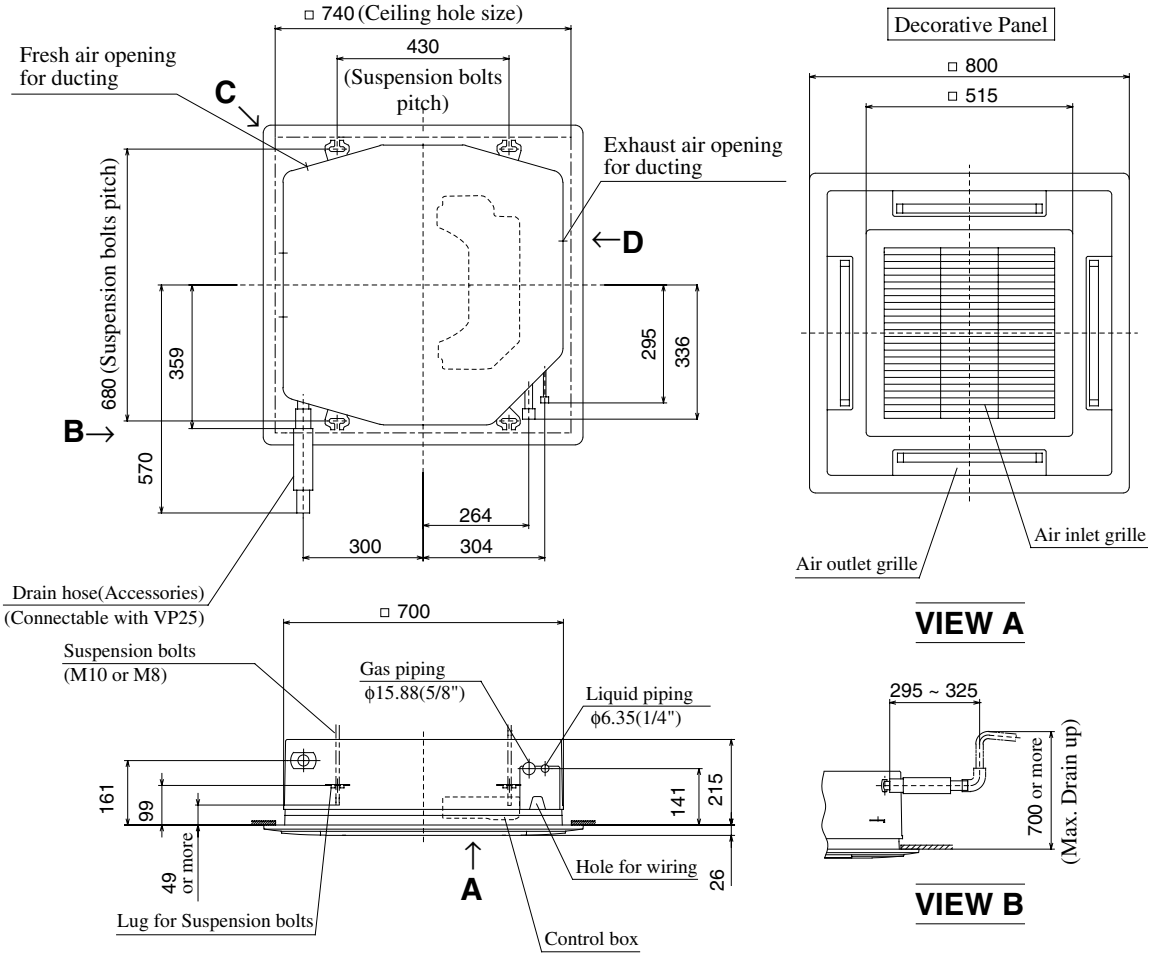
## 2.3 Exterior dimensions

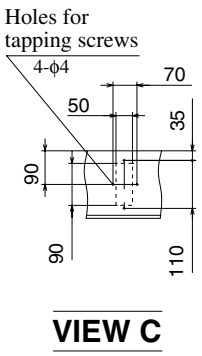
### (1) Indoor unit

#### (a) Ceiling recessed type (FDT)

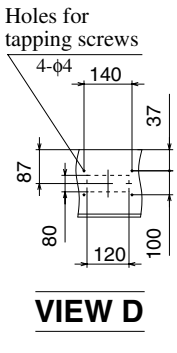
**Model FDT208-A**

Unit : mm

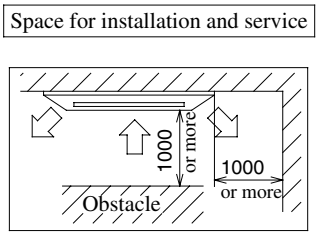



VIEW C

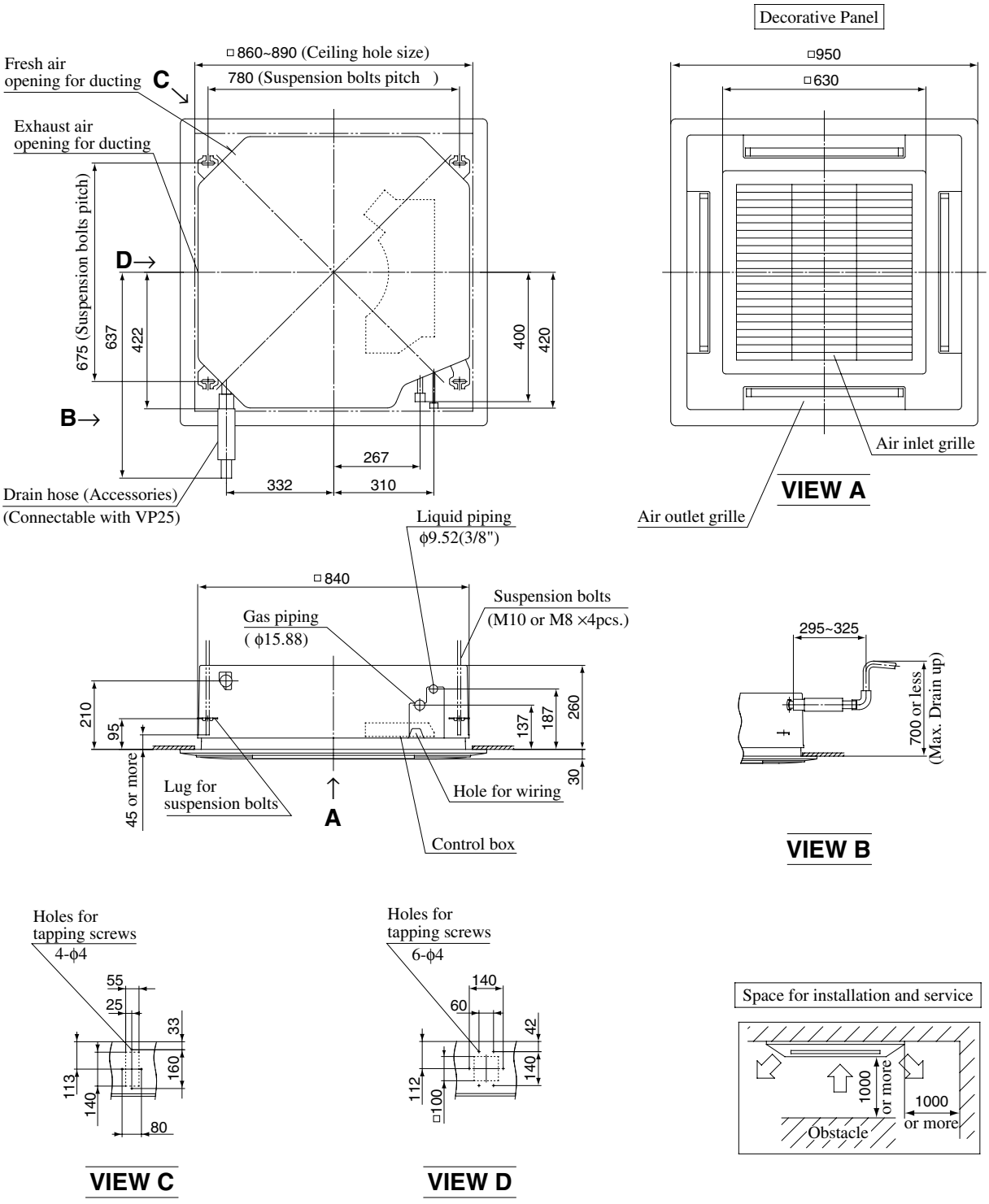



VIEW D



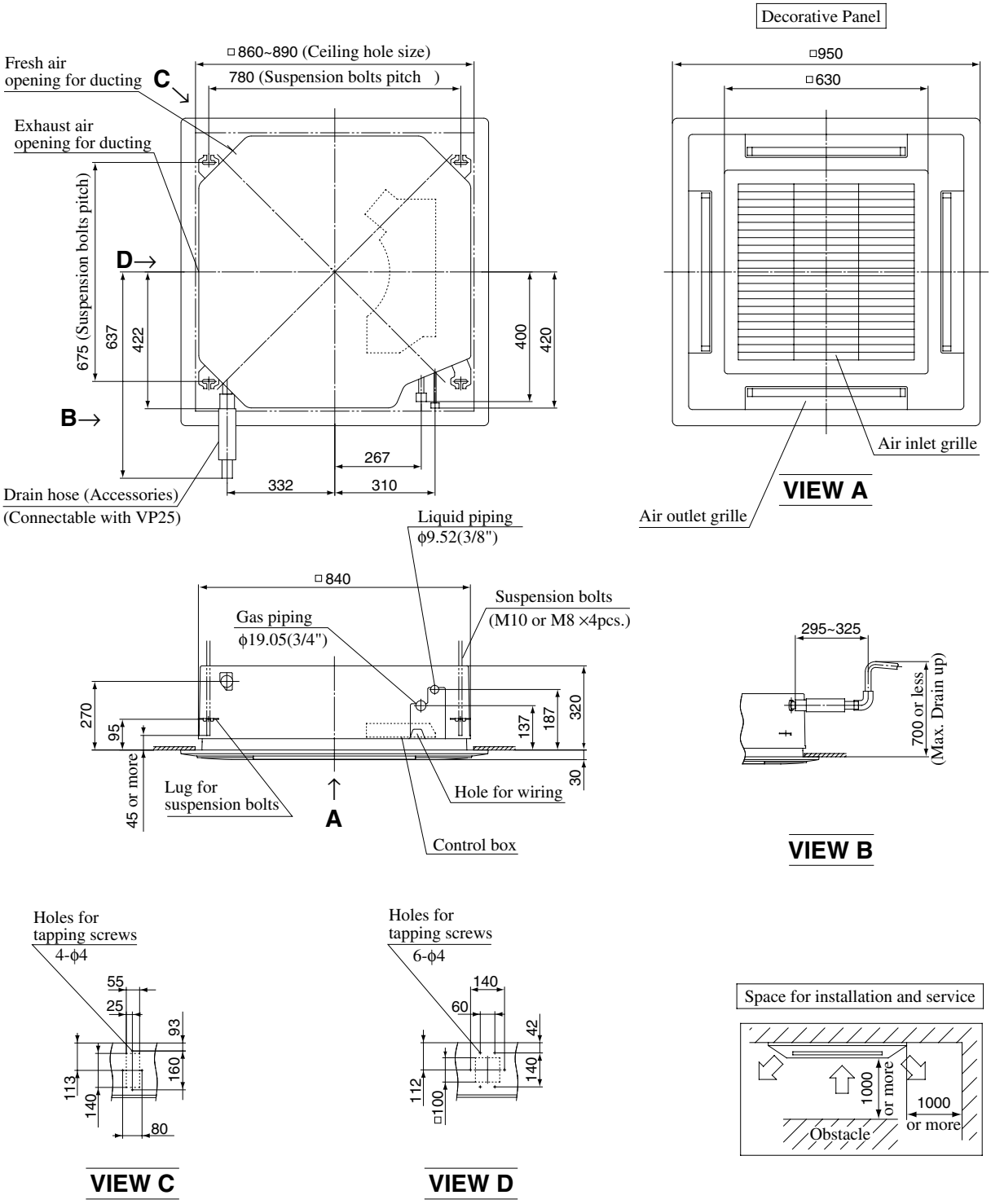
**Models FDT258-A, 308-A**

Unit : mm



**Models FDT408-A, 508-A**

Unit : mm

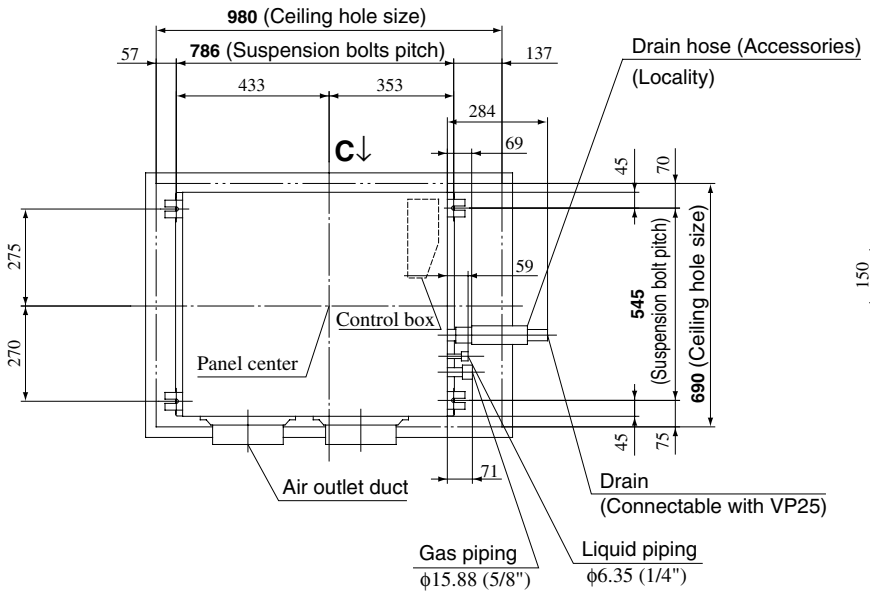


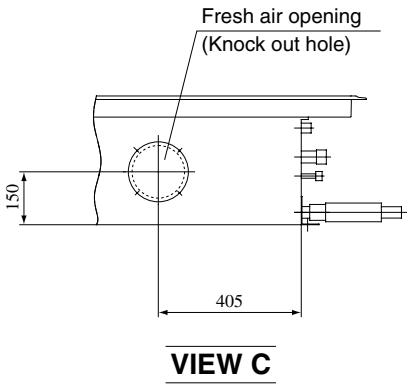
**(b) Cassetteria type (FDR)**

**Model FDR208-A**

**Silent Panel (Model: R-PNLS-26W-E)**

Unit : mm

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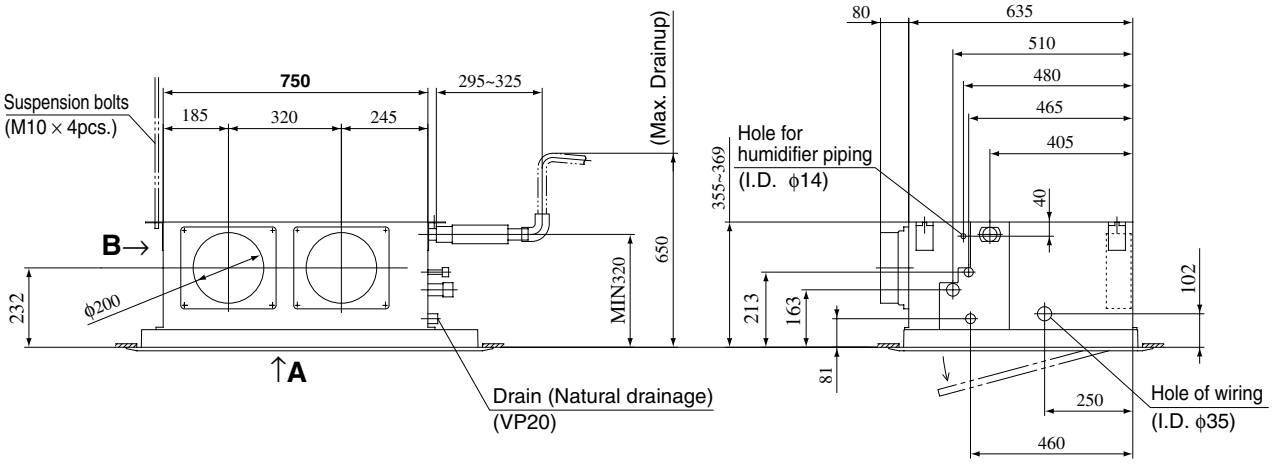


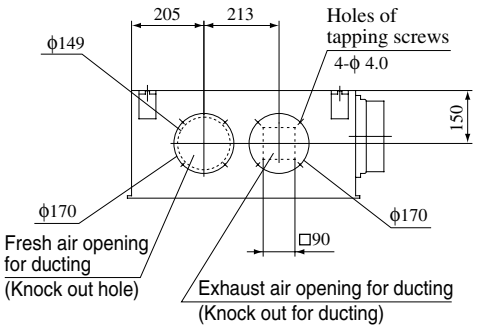


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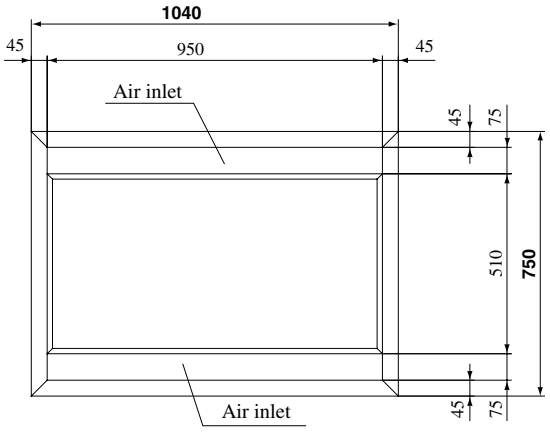
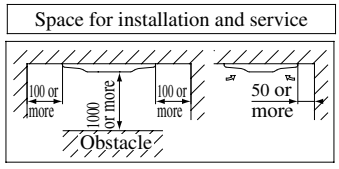


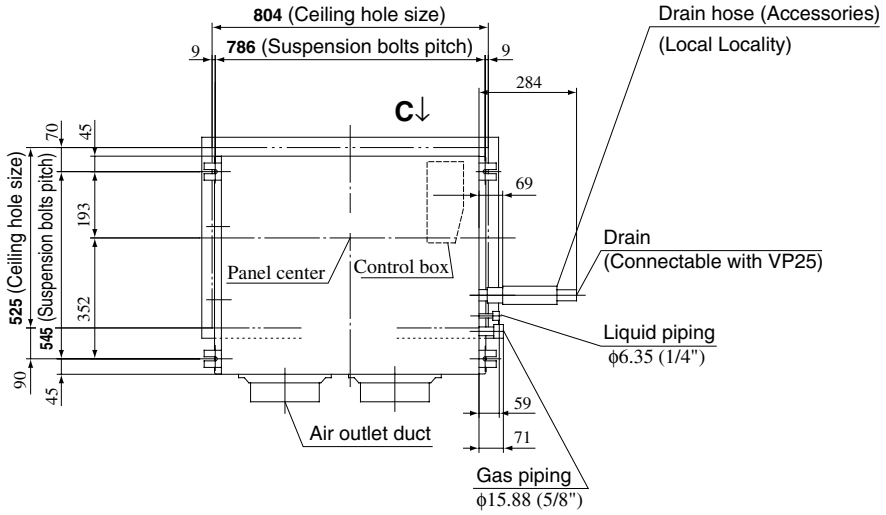

**VIEW A**

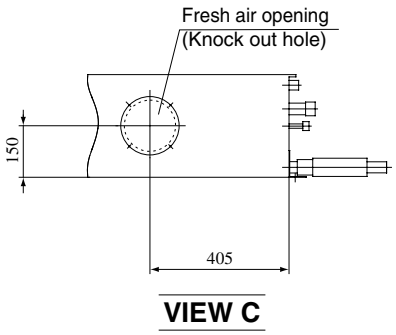


**Model FDR208-A**

**Canvas Panel (Model: R-PNLC-26W-E)**

Unit : mm

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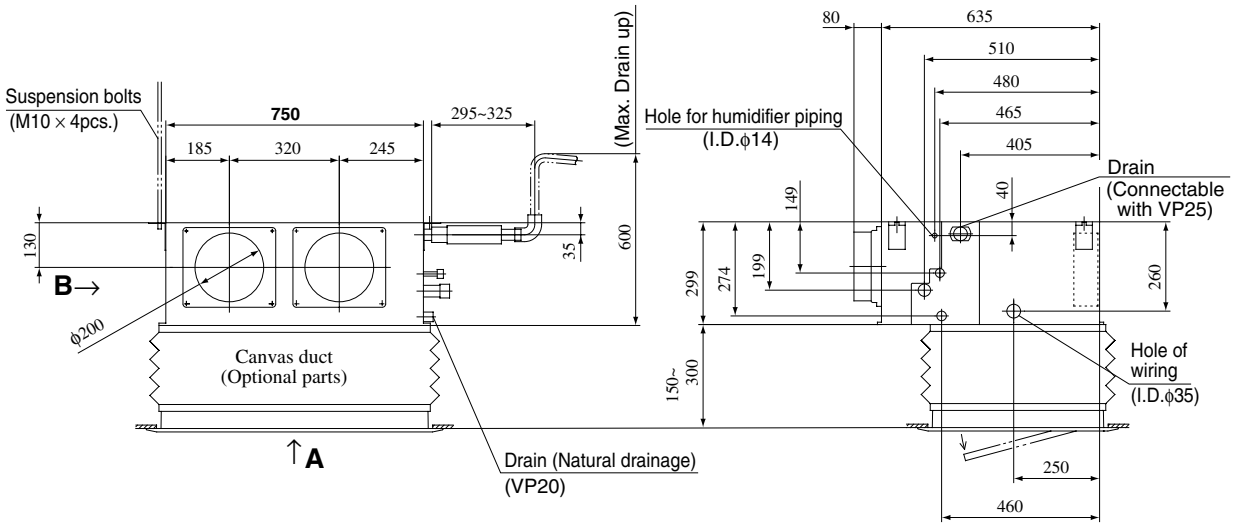


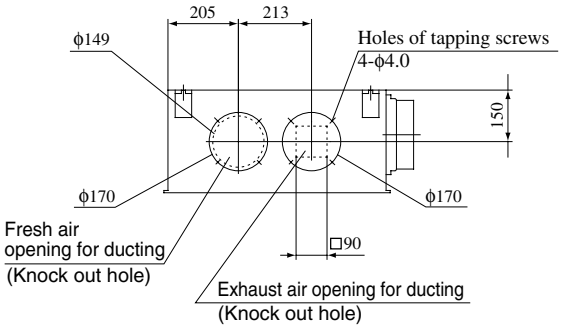


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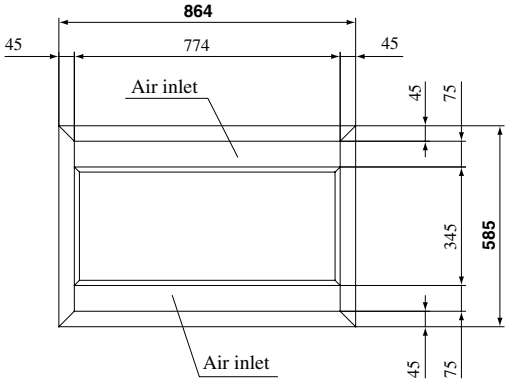


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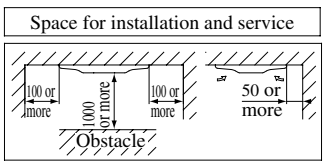
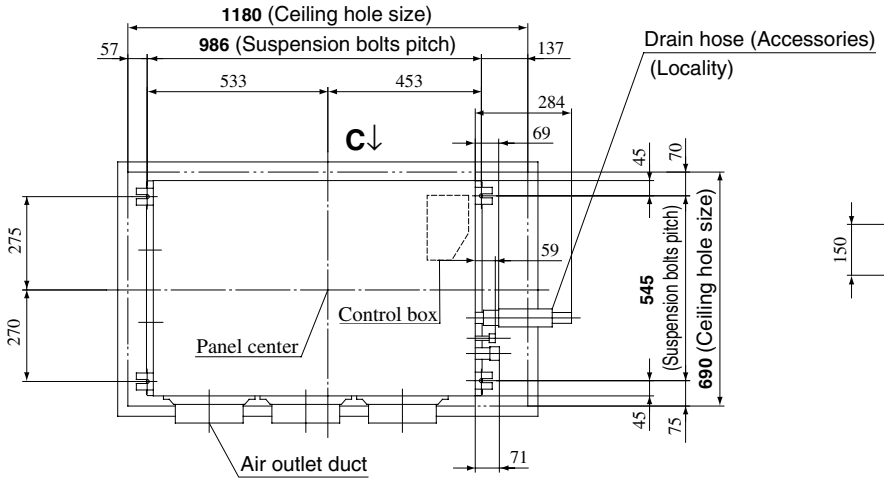
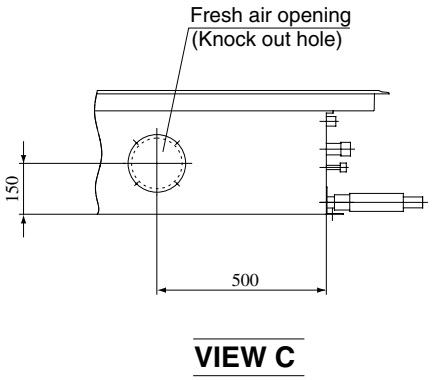


**Models FDR258-A, 308-A**

**Silent Panel (Model: R-PNLS-36W-E)**

Unit : mm

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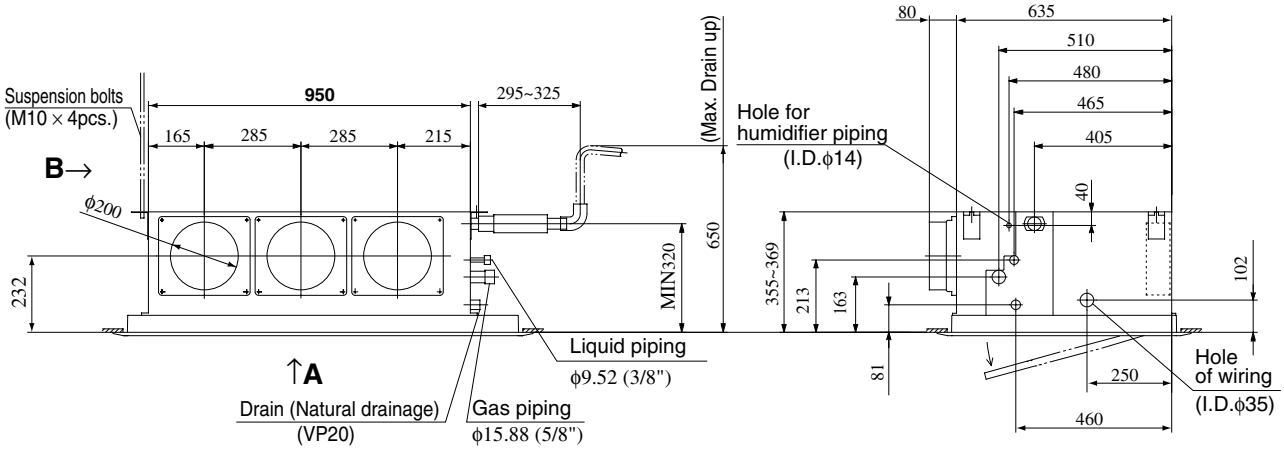


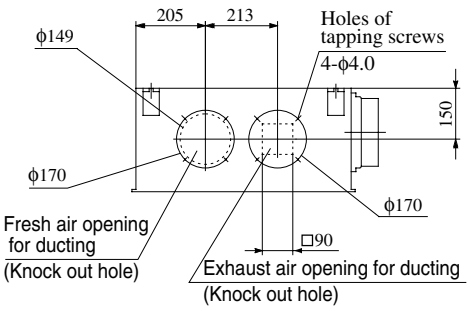


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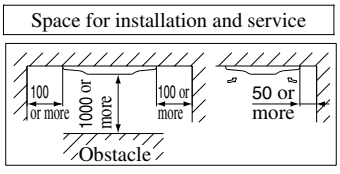
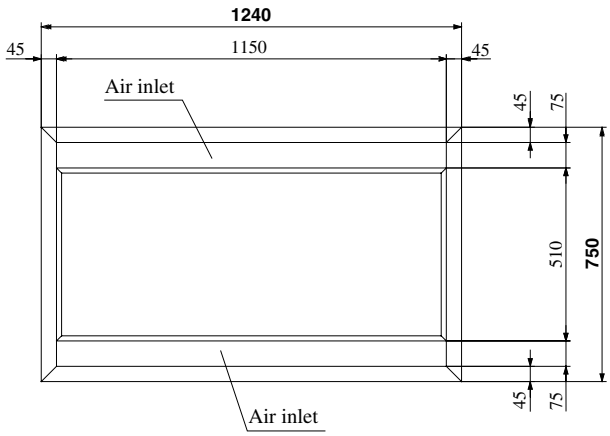


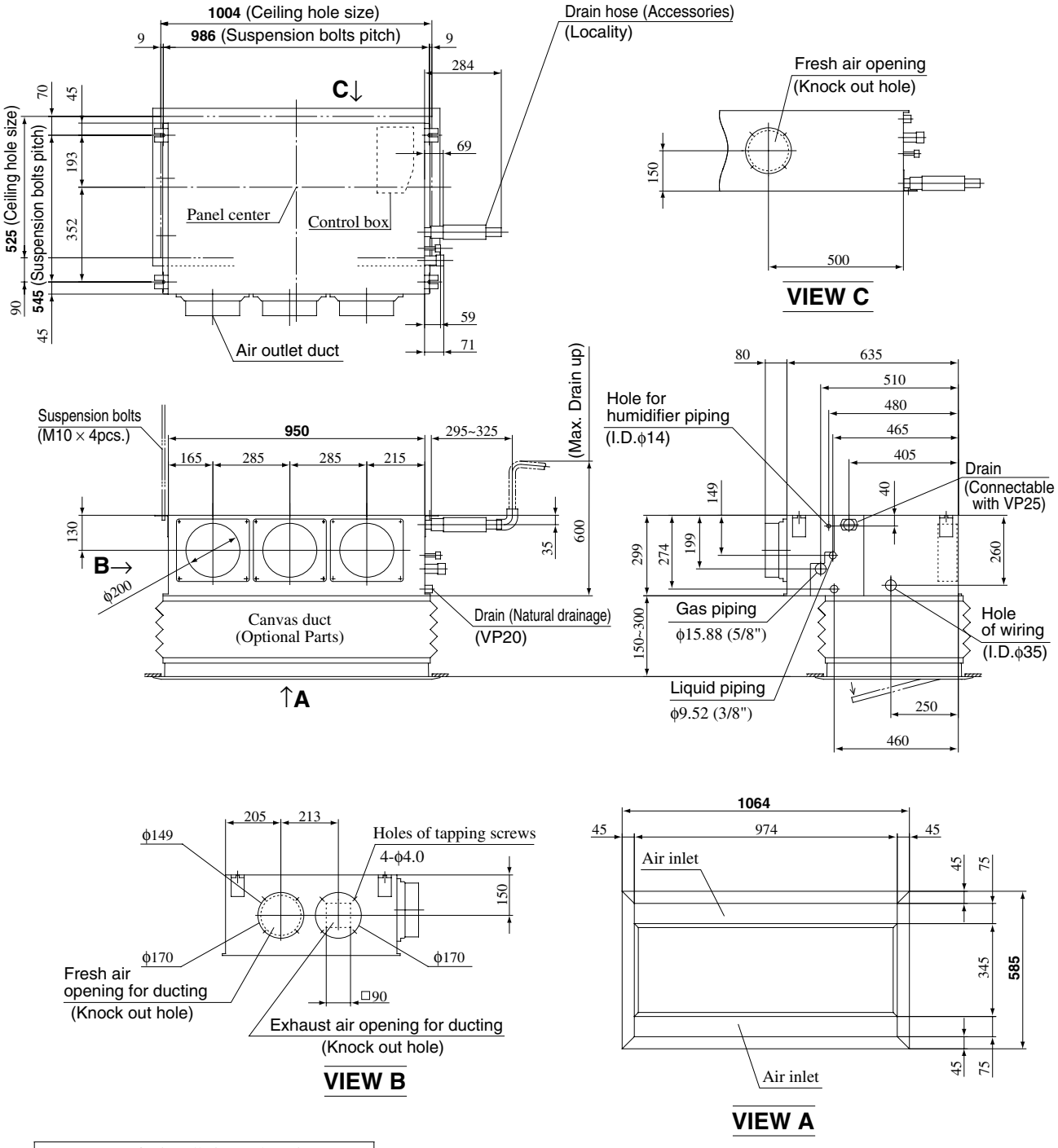




**VIEW A**

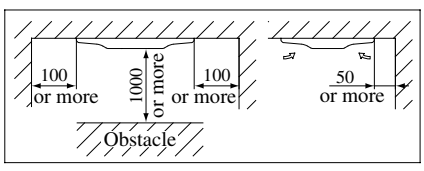
**Models FDR258-A, 308-A**

**Canvas Panel (Model: R-PNLC-36W-E)**

Unit : mm



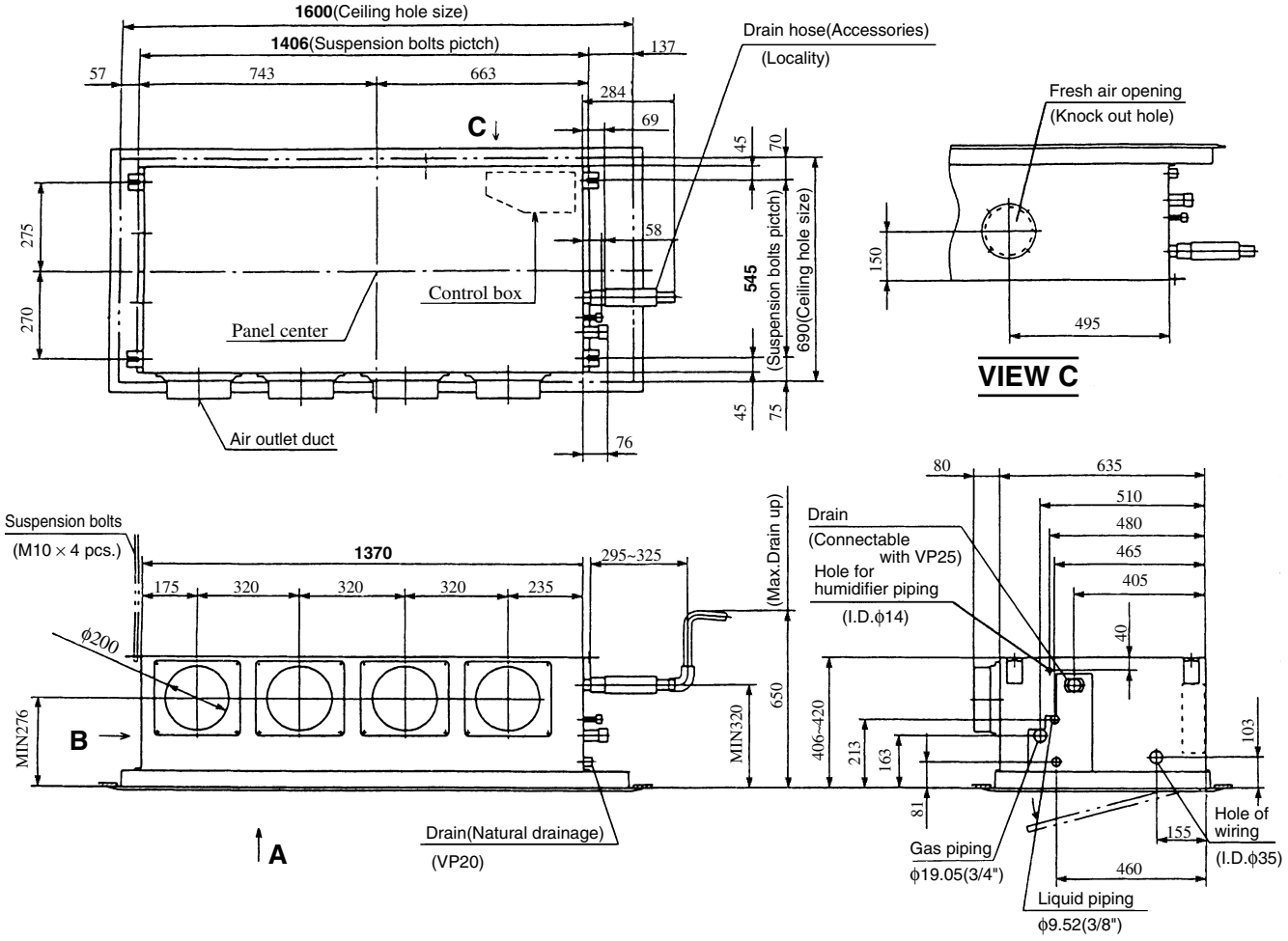

Space for installation and service

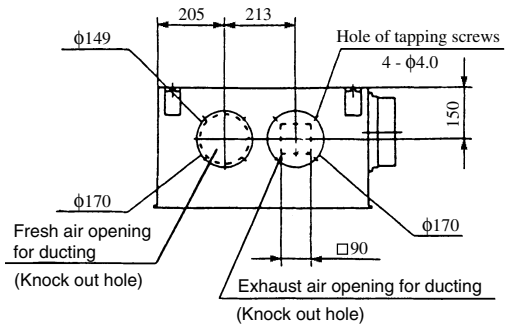


**Models FDR408-A, 508-A**

**Silent Panel (Model: R-PNLS-46W-E)**

Unit : mm

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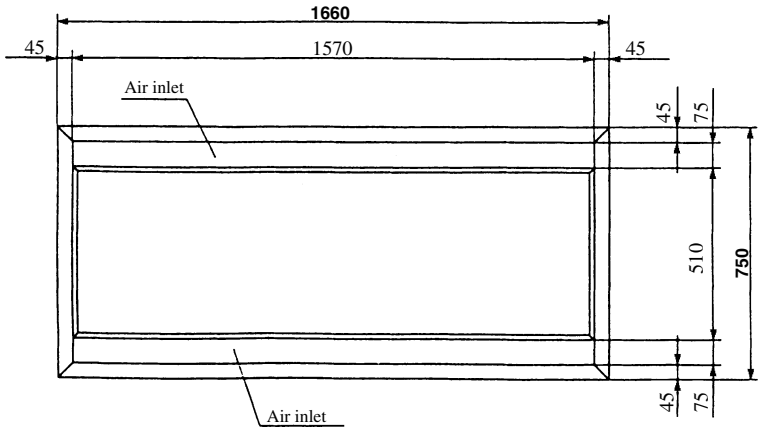
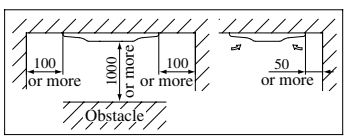



**VIEW A**

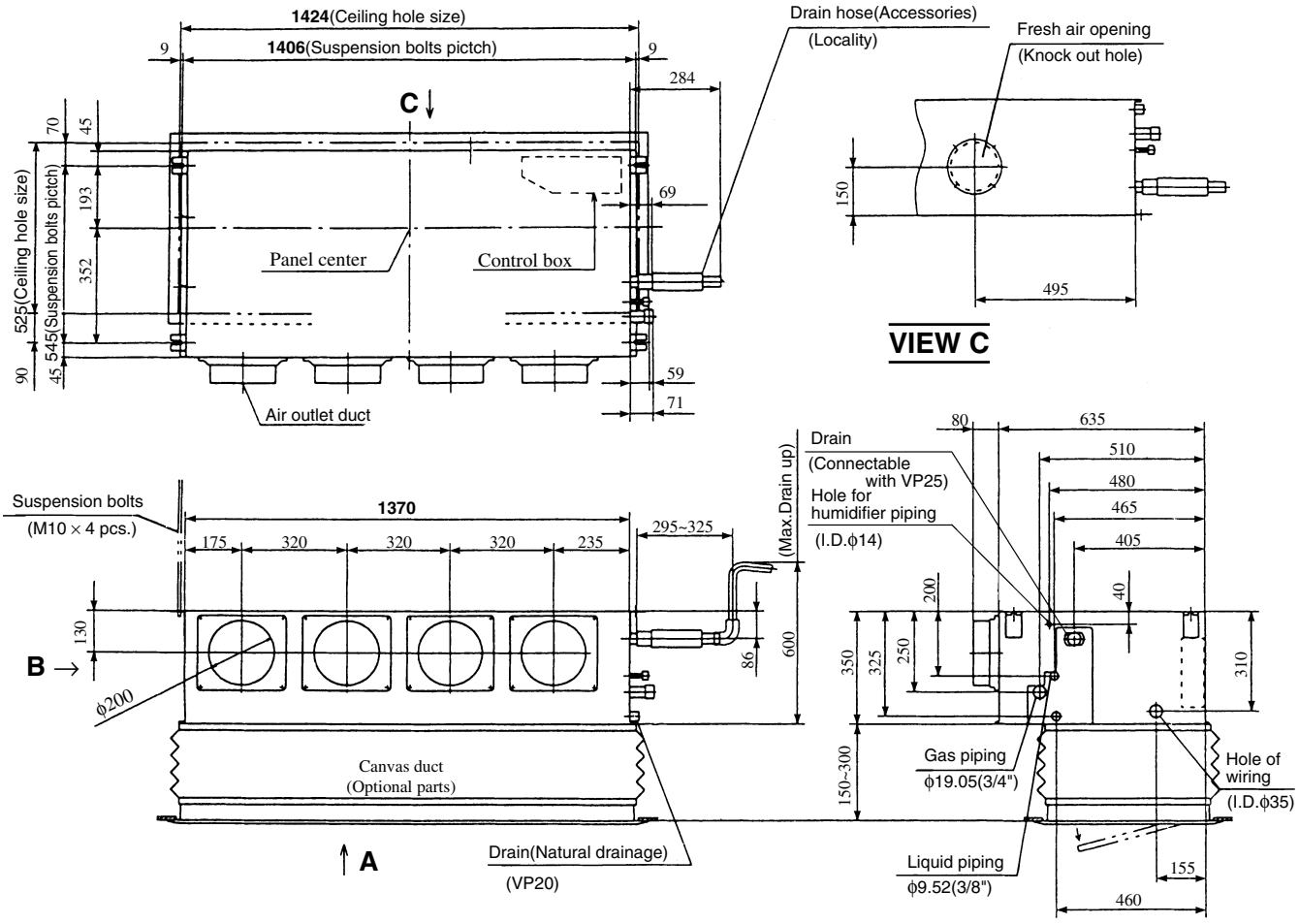
Space for installation and service

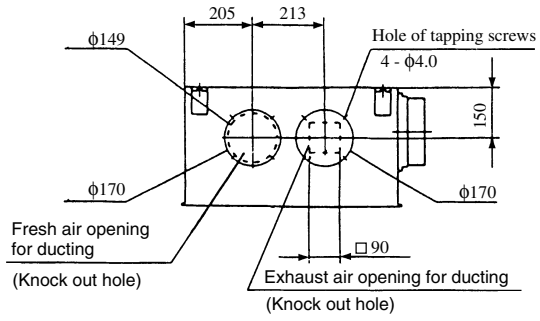


**Models FDR408-A, 508-A**

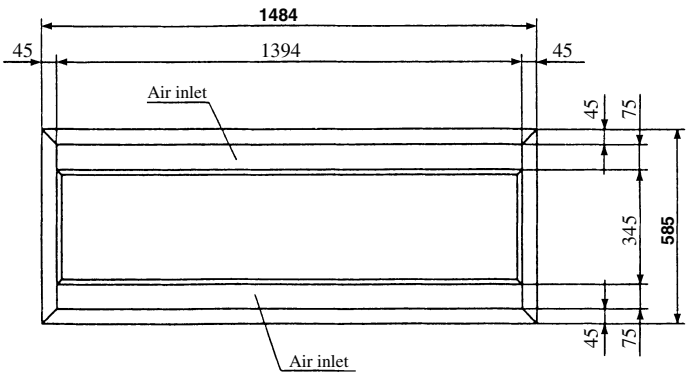
**Canvas Panel (Model: R-PNLC-46W-E)**

Unit : mm



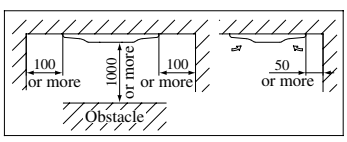




VIEW B




VIEW A

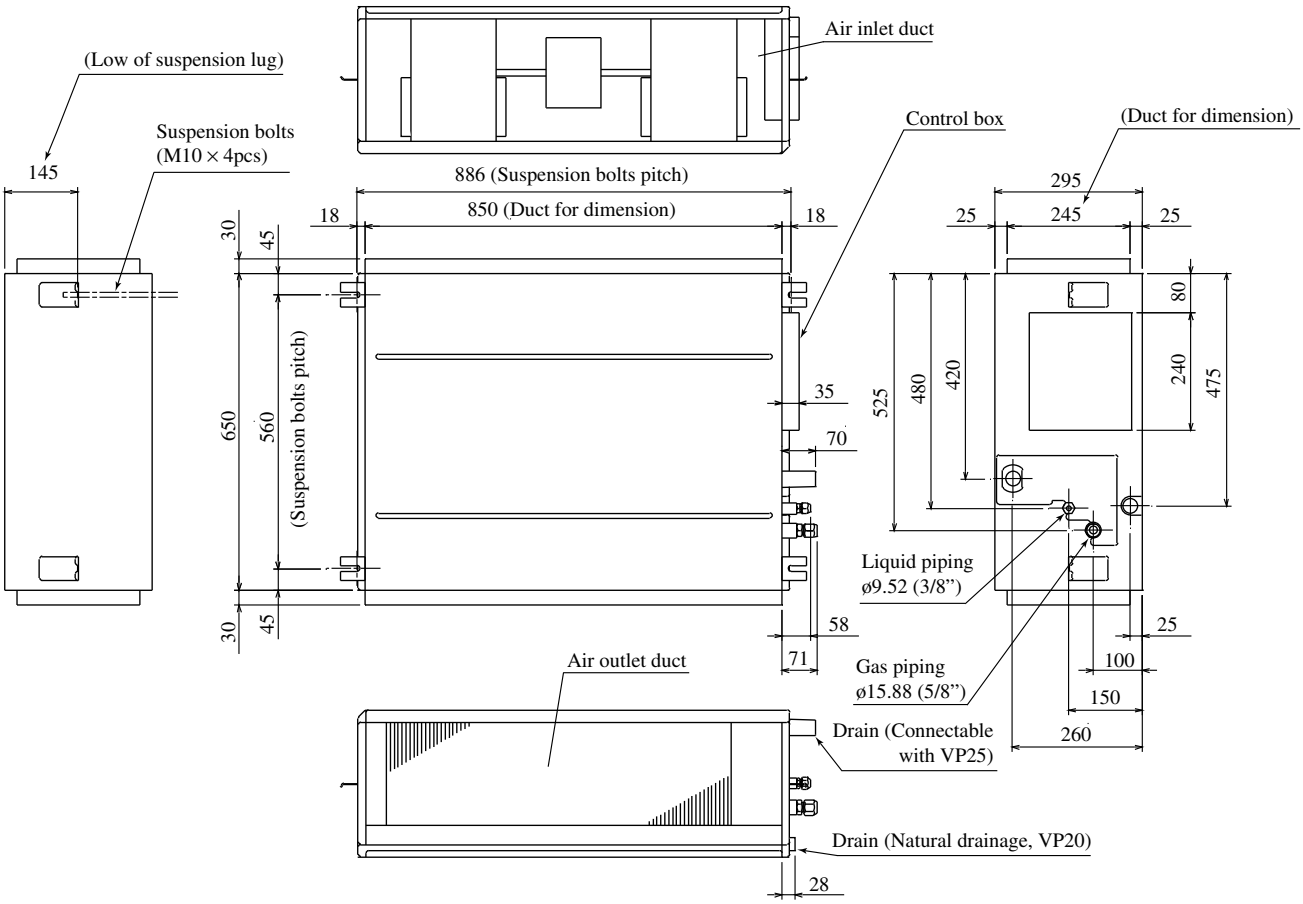
Space for installation and service



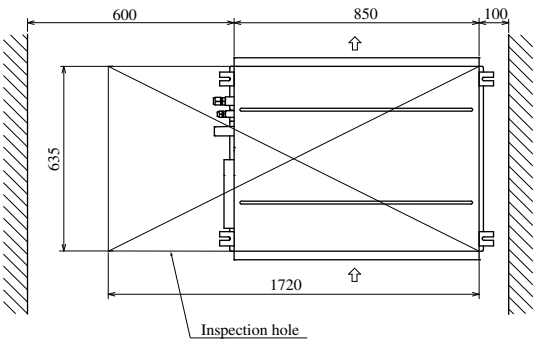
### (c) Ceiling mounted duct type

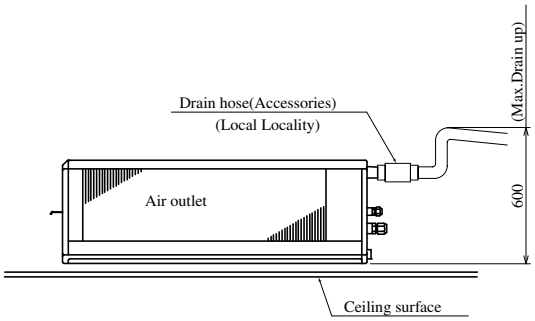
**Models FDUR208-A, 258-A, 308-A**

Unit : mm



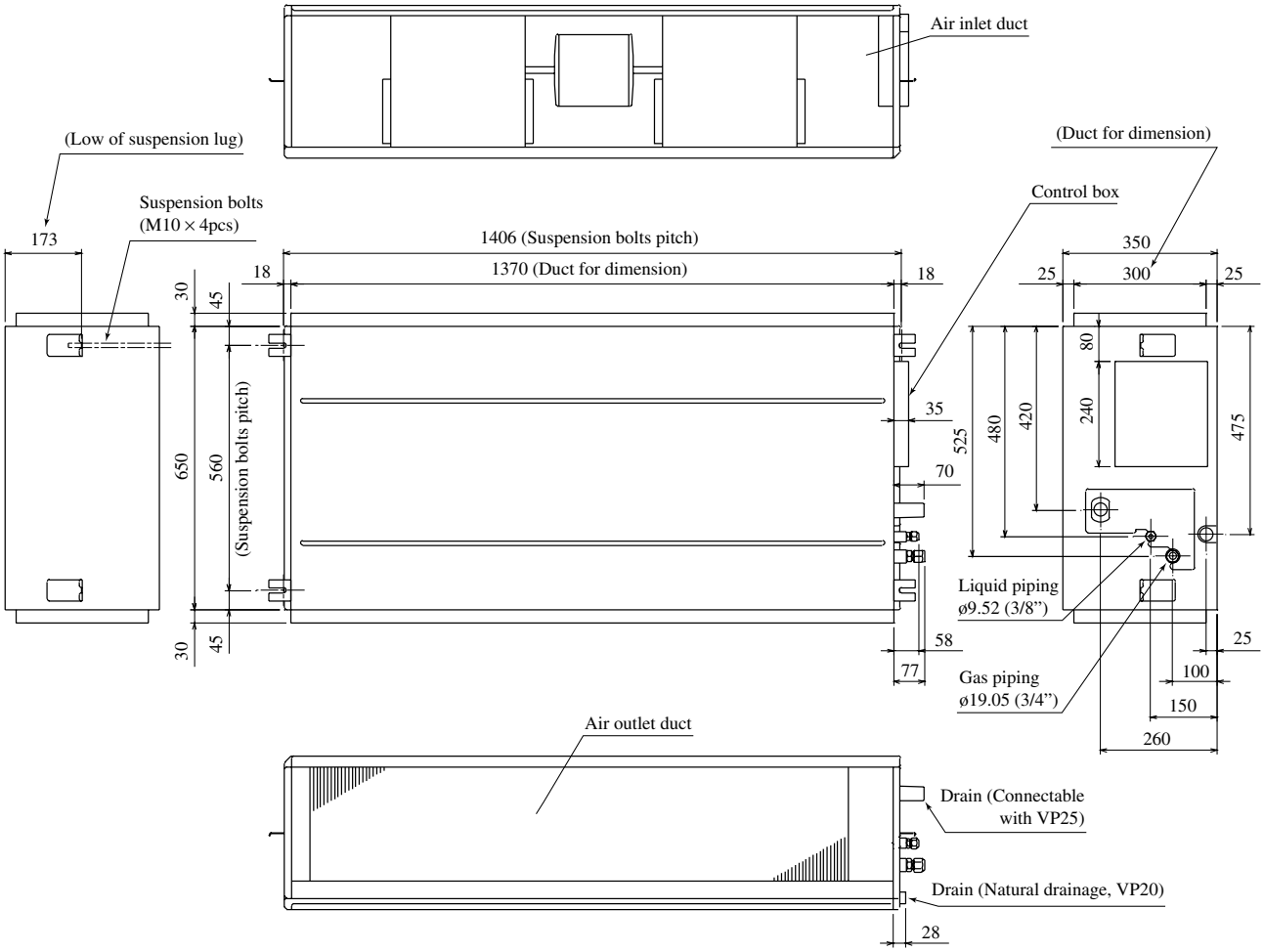

**Space for installation and service**



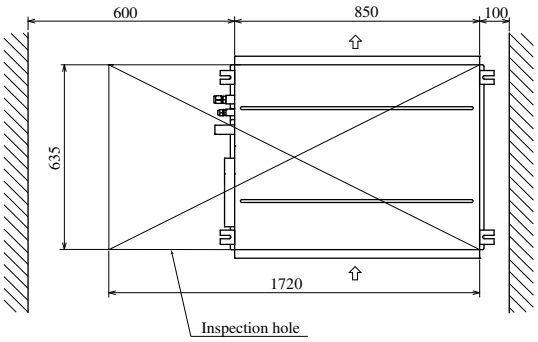



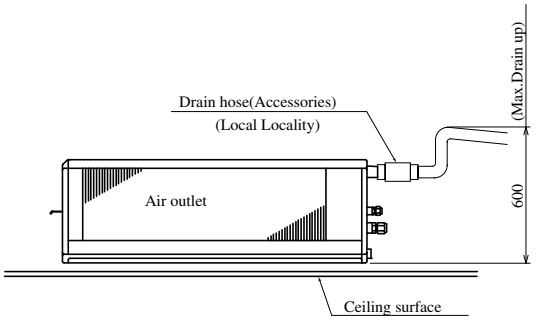
**Models FDUR408-A, 508-A**

Unit : mm



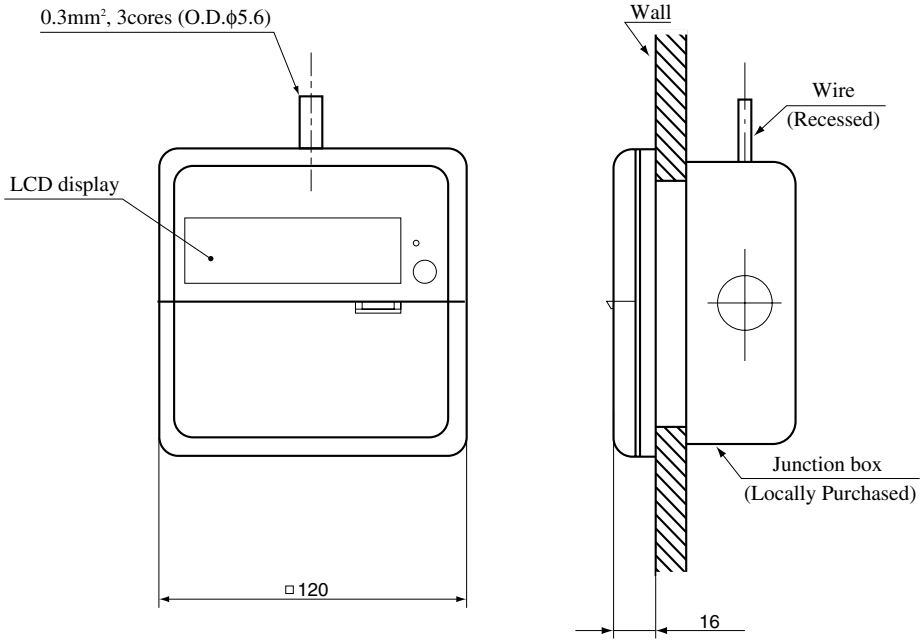

**Space for installation and service**



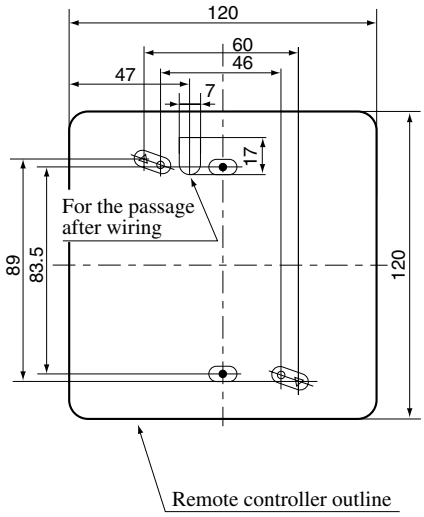



### (2) Remote controller (Optional parts)

Unit : mm




Remote controller mounting dimensions




Note (1) Allowable length of remote controller cable: 600 m

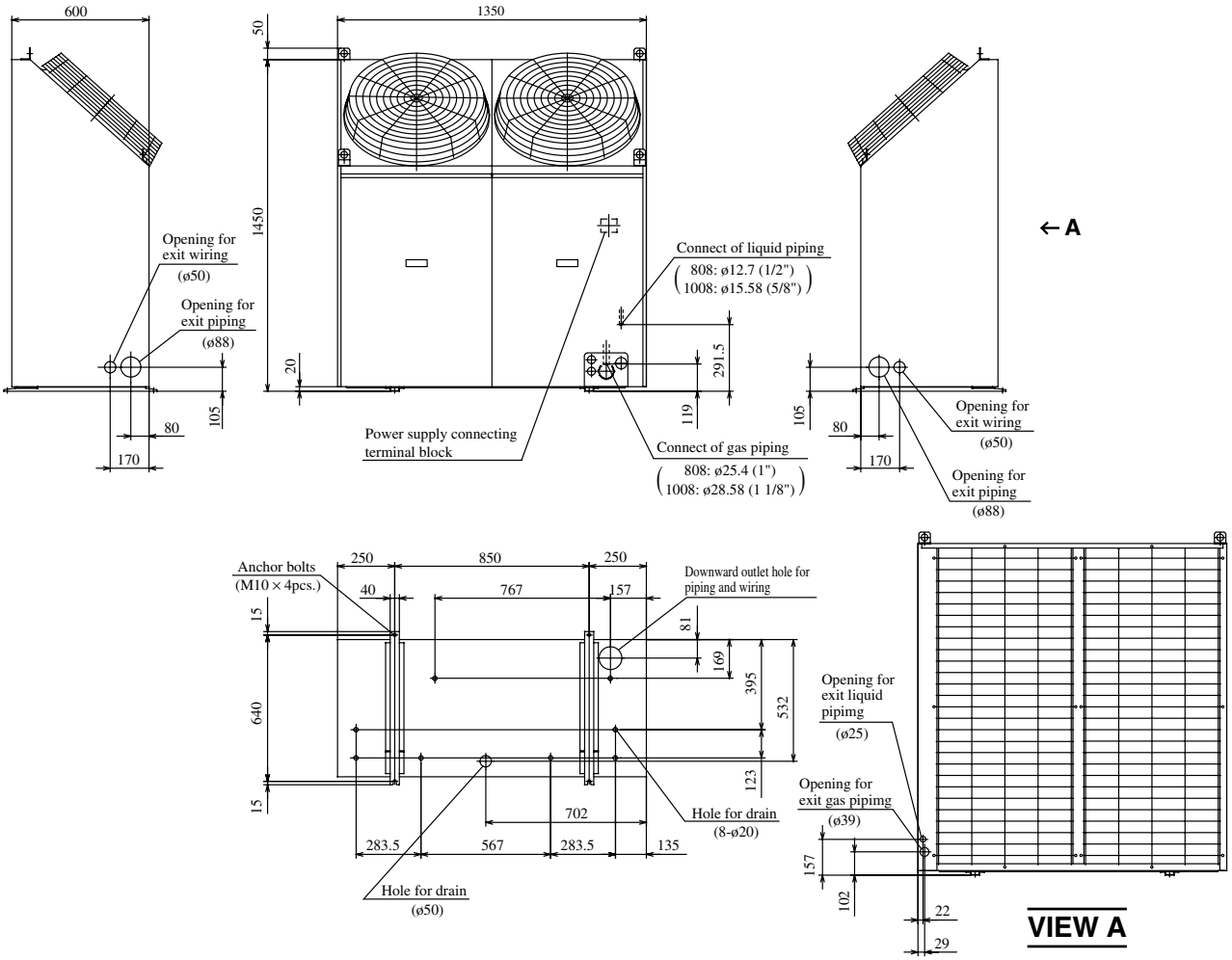
**Allowable rang of wire thickness and length**

| | | |
|---|---|---|
| Standard Within | 0.3 mm² | × Within 100 m |
| | 0.5 mm² | × Within 200 m |
| | 0.75 mm² | × Within 300 m |
| | 1.25 mm² | × Within 400 m |
| | 2 mm² | × Within 600 m |

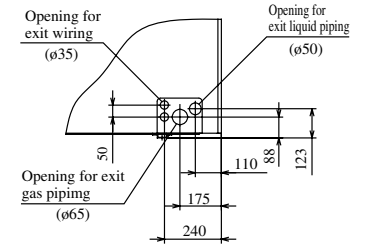
## (3) Outdoor unit

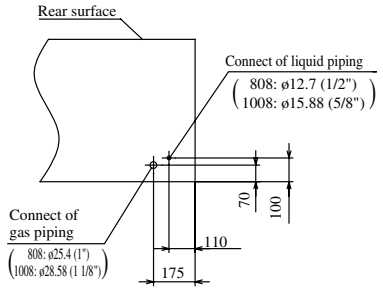
Unit: mm

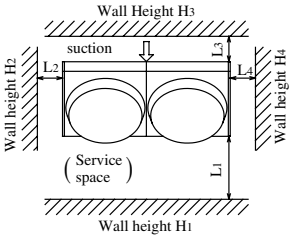
### Models FDCP808HES3, 1008HES3




### Dimentions of refrigerant piping connecting mouth (Front)




(Unit:mm)

| Dimensions \ Installation example | I | II | III |
|---|---|---|---|
| $L_1$ | Open | Open | 500 |
| $L_2$ | 0 | 0 | 0 |
| $L_3$ | 300 | 300 | 300 |
| $L_4$ | Open | 500 | 0 |
| $H_1$ | —— | —— | 1000 or less |
| $H_2$ | Not limited | Not limited | Not limited |
| $H_3$ | Not limited | Not limited | 700 or less |
| $H_4$ | —— | Not limited | Not limited |

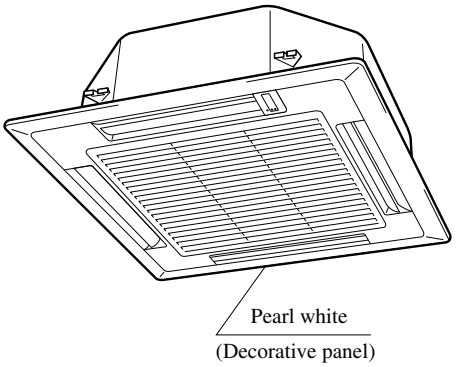
Notes (1) Make sure to secure the unit with anchor bolts.
(2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
(3) Make sure to allow the space of 1 m or more above the unit.
(4) Connect the refrigerant piping (both gas side and liquid side) at local site.
(5) If the wall height $H_1$, $H_3$ of installation example III exceeds the limited value, make sure the value of $L_1$, $L_3$ are to be as follows.
$L_1 = H_1 - 500$
$L_3 = 300 + (H_3 - 700) / 2$, however, if $L_3$ exceeds 600, there is no limit for the wall height $H_3$.

## 2.4 Exterior appearance

### (1) Indoor unit

#### (a) Ceiling recessed type (FDT)

**Models All models**

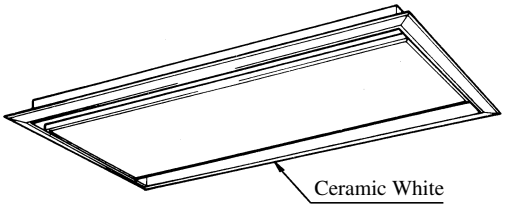



| Type \ Item | Panel model |
|---|---|
| FDT208-A | T-PSA-22W-E |
| FDT258-A~508-A | T-PSA-32W-E |

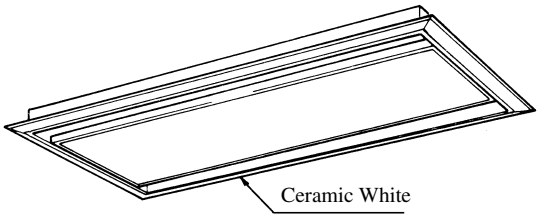
#### (b) Cassetteria type (FDR)

**Models All models**

**Silent panel type**

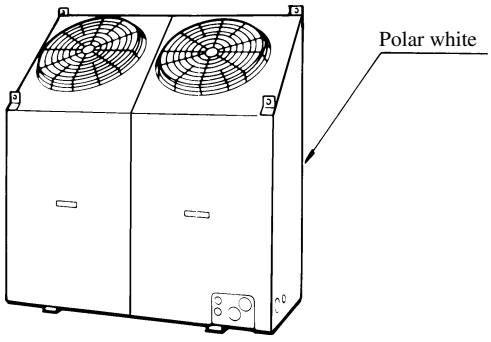



**Canvas-duct panel type**




### (2) Outdoor unit

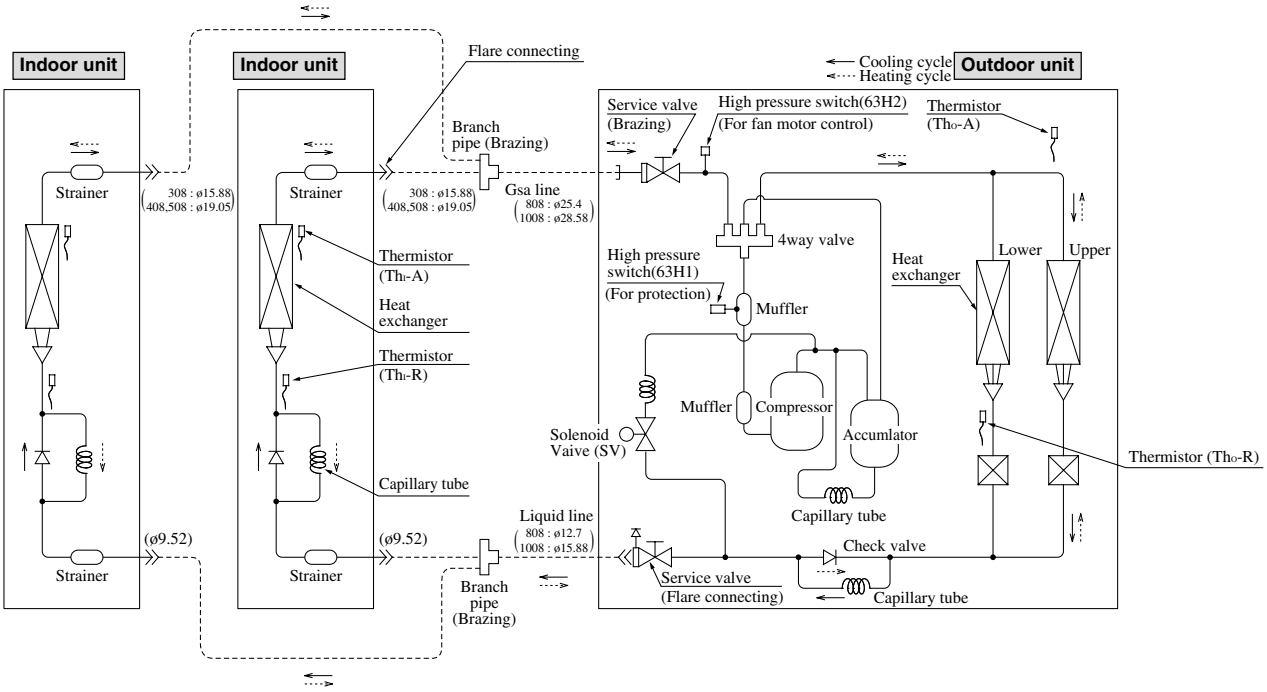
**Models FDCP808HES3, 1008HES3**



## 2.5 Piping system

### (1) Twin type

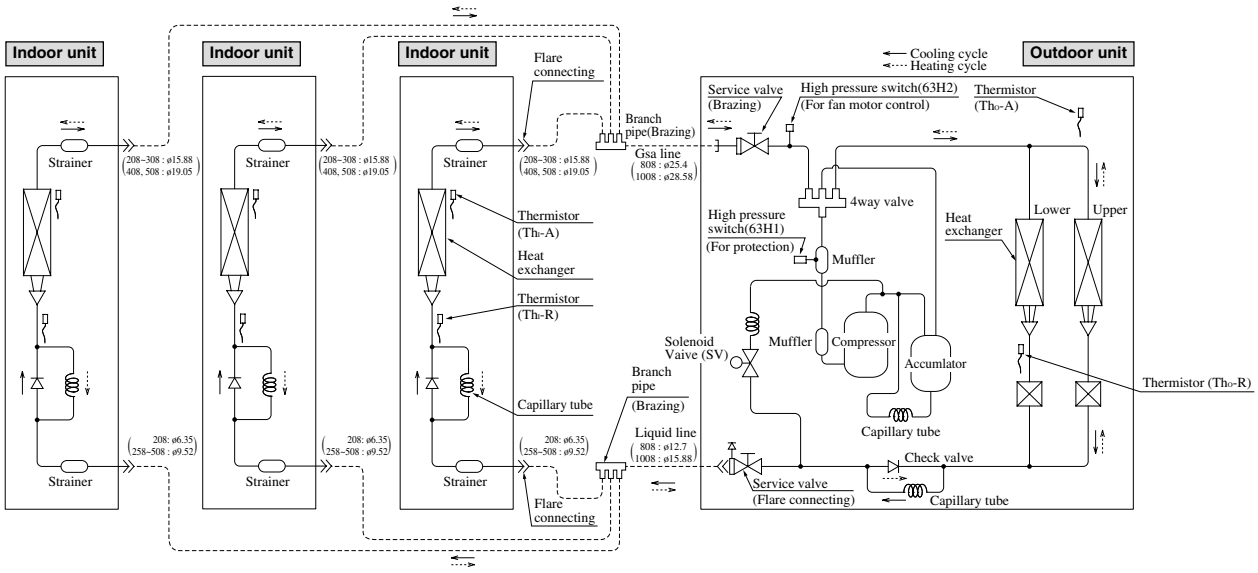
**Models FDCP808HES3,1008HES3**




Note (1) Refer to page 72 for piping size after branching.

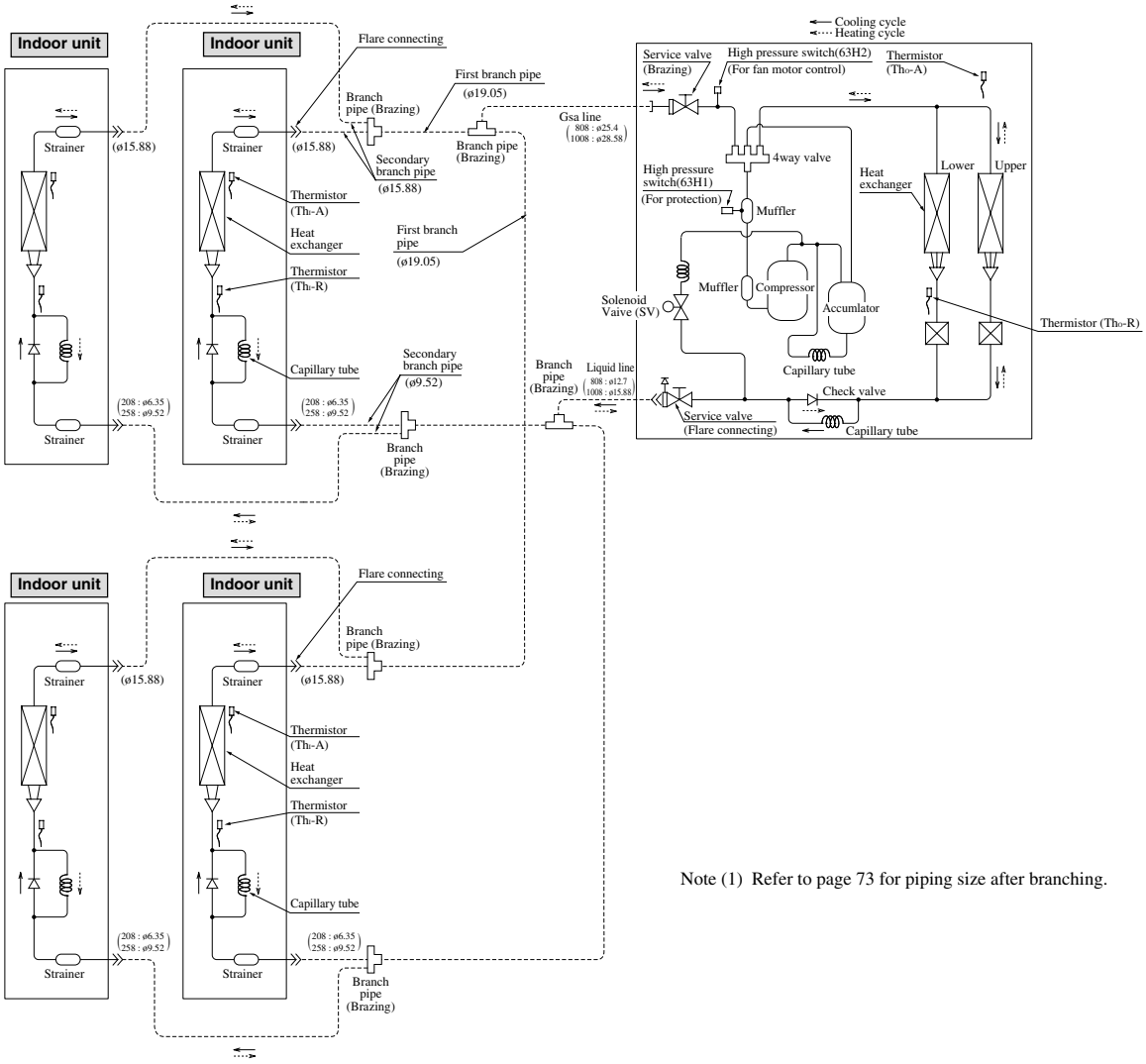
### (2) Triple type

**Models FDCP808HES3,1008HES3**




Note (1) Refer to page 73 for piping size after branching.

### (3) Dauble twin type
### Models FDCP808HES3,1008HES3




Note (1) Refer to page 73 for piping size after branching.

## Preset point of the protective devices

| Parts name | Mark | Equipped unit | FDCP808HES3, 1008HES3 |
|---|---|---|---|
| **Thermistor (for protection over-loading in heating)** | **Thi-R** | Indoor unit | OFF 68˚C<br>ON 61˚C |
| **Thermistor (for frost prevention)** | | | OFF 2.5˚C<br>ON 10˚C |
| **Thermistor (for detecting heat exchange temp.)** | **Tho-R** | Outdoor unit | OFF 70˚C<br>ON 60˚C |
| **High pressure switch (for controlling FM0)** | **63H2** | | OFF 2.79MPa<br>ON 2.26MPa |
| **High pressure switch (for protection)** | **63H1** | Outdoor unit | OFF 3.24MPa<br>ON 2.65MPa |

## 2.6 Selection chart

Correct the cooling and heating capacity in accordance with the conditions as follows. The net cooling and heating capacity can be obtained in the following way.

**Net capacity = Capacity shown on specifications × Correction factors as follows.**

**(1) Coefficient of cooling and heating capacity in relation to temperatures**

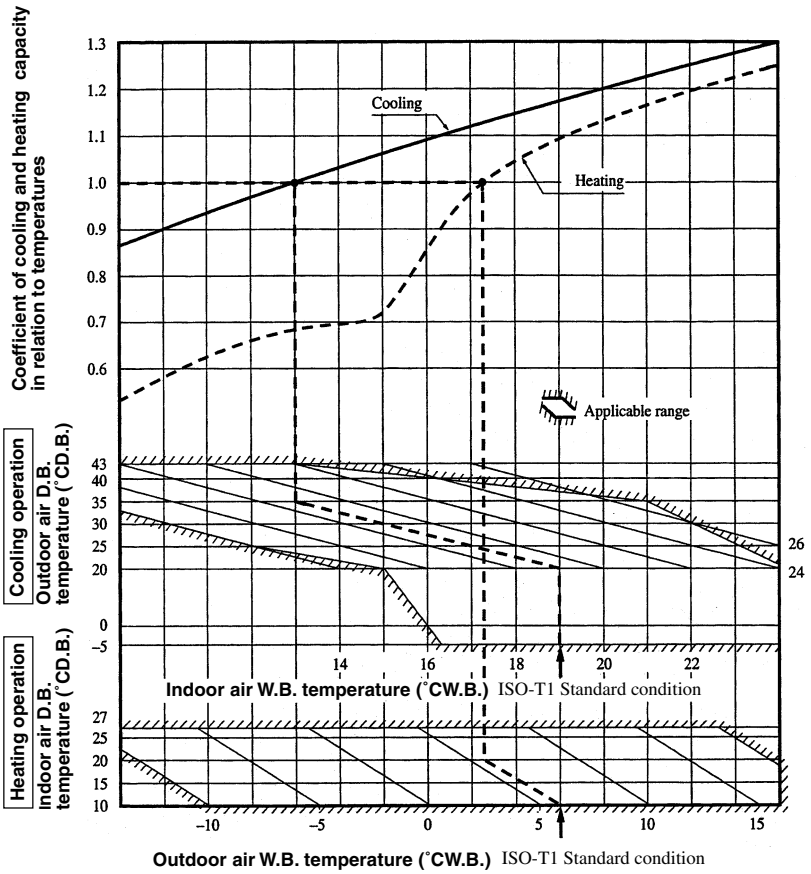



**Table of bypass factor**

**FDT series**

| Item \ Model | | 208 | 258 | 308 | 408 | 508 |
|---|---|---|---|---|---|---|
| Air flow | Hi | 0.112 | 0.050 | 0.065 | 0.076 | 0.025 |
| | Lo | 0.073 | 0.030 | 0.030 | 0.050 | 0.013 |

**FDR series**

| Item \ Model | | 208 | 258 | 308 | 408 | 508 |
|---|---|---|---|---|---|---|
| Air flow | Hi | 0.035 | 0.032 | 0.039 | 0.085 | 0.035 |
| | Lo | 0.021 | 0.020 | 0.023 | 0.060 | 0.023 |

**FDUR series**

| Item \ Model | | 208 | 258 | 308 | 408 | 508 |
|---|---|---|---|---|---|---|
| Air flow | Hi | 0.111 | 0.053 | 0.069 | 0.106 | 0.050 |
| | Lo | 0.083 | 0.037 | 0.049 | 0.079 | 0.034 |

**(2) Correction of cooling and heating capacity in relation to air flow rate control (fan speed)**

**Coefficient: 1.00 at High, 0.95 at Low**

**(3) Correction of cooling and heating capacity in relation to one way length of refrigerant piping**

It is necessary to correct the cooling and heating capacity in relation to the one way equivalent piping length between the indoor and outdoor units.

| Equivalent piping length(1) m | | 7.5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Heating | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.998 | 0.998 | 0.993 | 0.993 | 0.988 | 0.988 |
| Cooling | FDC808, 1008 | 1.0 | 0.995 | 0.985 | 0.975 | 0.965 | 0.955 | 0.945 | 0.935 | 0.925 | 0.915 | 0.905 |

Note (1) Equivalent piping length can be obtained by calculating as follows.
808 [ϕ25.4 (1 ″)] : Equivalent piping length = Real piping length + (0.40 × Number of bends in piping)
1008 [ϕ28.58 (1 1/8″)] : Equivalent piping length = Real piping length + (0.45 × Number of bends in piping)
[Equivalent piping length < Limitation length of piping + 5m]

**(4)** When the outdoor unit is located at a lower height than the indoor unit in cooling operation and when the outdoor unit is located at a higher height than the indoor unit in heating operation, the following values should be subtracted from the values in the above table.

| Height difference between the indoor unit and outdoor unit in the vertical height difference | 5m | 10m | 15m | 20m | 25m | 30m |
|---|---|---|---|---|---|---|
| Adjustment coefficient | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 |

## Piping length limitations

| Item \ Model | All models |
|---|---|
| **Max. one way piping length** | 50m |
| **Max. vertical height difference** | Outdoor unit is higher 30m<br>Outdoor unit is lower 15m |

Note (1) Values in the table indicate the one way piping length between the indoor and outdoor units.

## How to obtain the cooling and heating capacity

Example : The net cooling capacity of the model FDCP808HES3 with the air flow "High", the piping length of 40m, the outdoor unit located 5m lower than the indoor unit, indoor wet-bulb temperature at 19.0 ˚C and outdoor dry-bulb temperature 35 ˚C is

Net cooling capacity = $\underline{20000}$ × $\underline{1.00}$ × $\underline{(0.935 - 0.01)}$ × $\underline{1.0}$ = 18500 w

- 20000 : FDCP808HES3
- 1.00 : Air flow "High"
- (0.935 - 0.01) : Length 40 m. Height difference 5 m
- 1.0 : Factor by air temperatures

## 2.7 Characteristics of fan

### (1) Cassetteria type (FDR)

**• External static pressure table**

Unit: Pa

| Type \ Duct specs. / Air flow (m³/min) | | 1 spot closing(1) | | Standard(2) | | Square duct(3) | |
|---|---|---|---|---|---|---|---|
| | | Stan-dard | High speed(4) | Stan-dard | High speed(4) | Stan-dard | High speed(4) |
| FDR208-A | 14 | — | — | 50 | 85 | 50 | 90 |
| FDR258-A | 18 | 30 | 65 | 45 | 80 | 50 | 85 |
| FDR308-A | 20 | 25 | 60 | 45 | 80 | 50 | 85 |
| FDR408-A | 28 | 40 | 70 | 50 | 80 | 50 | 85 |
| FDR508-A | 34 | 40 | 70 | 50 | 80 | 55 | 85 |

Notes (1) 1 spot closing: Round duct flange at center is removed and shield with a decorative panel (option).

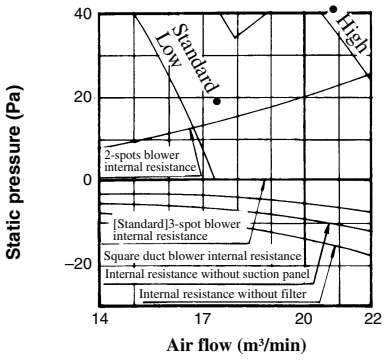
(2) Standard: ø200 ducts are installed at all blowout holes.

(3) Square duct: All round ducts are removed and replaced with special square duct flanges (option).

(4) When operating at a high speed, invert the connection of white and red connectors on the flank of control box.

**How to interpret the blower characteristics table**

**Example : Case of FDR308-A**

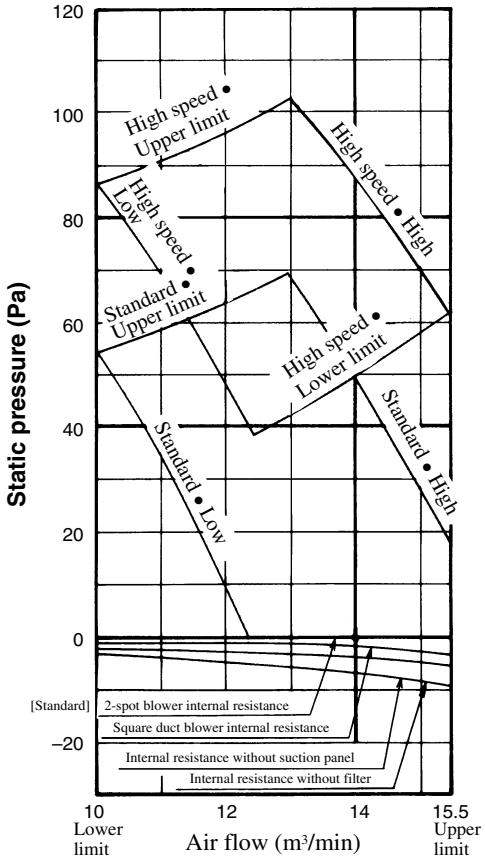



① **2-spot blowout.....**
Internal resistance increases more than the standard 3-spot blowout. Approx. 14 Pa at 17m³/min.

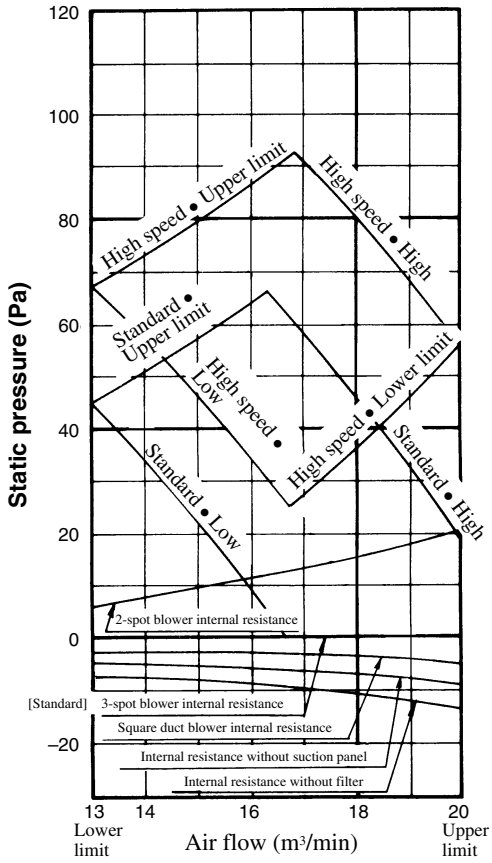
② **Square duct blowout.....**
Internal resistance decreases more than the standard round duct (ø200 3-spot). 3 Pa at 17 m³/nin. (External static pressure increases in reverse.).

③ **Decorative panel.....**
When the decorative panel is not used with the ceiling return type, the part of internal resistance related to the panel decrease. 3 Pa at 17mm³/min.

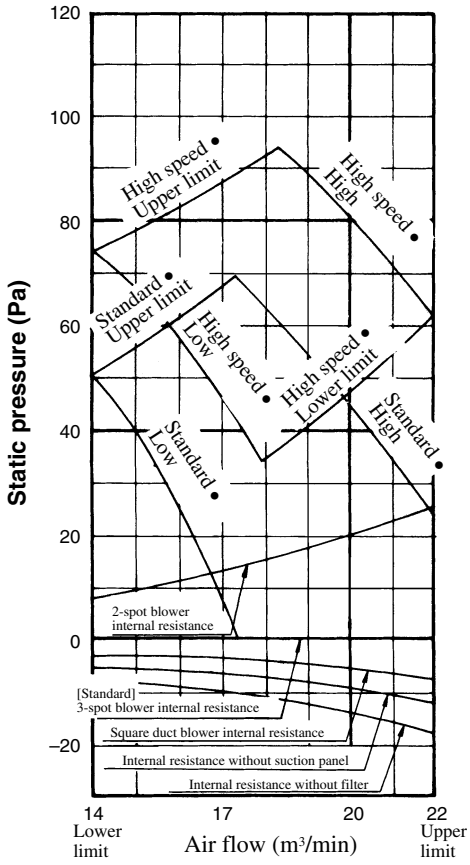
**Model FDR208-A**



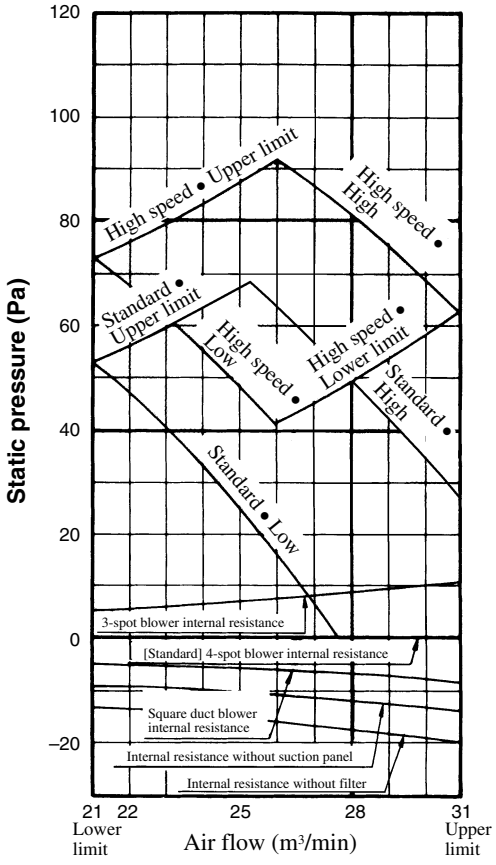

**Model FDR258-A**



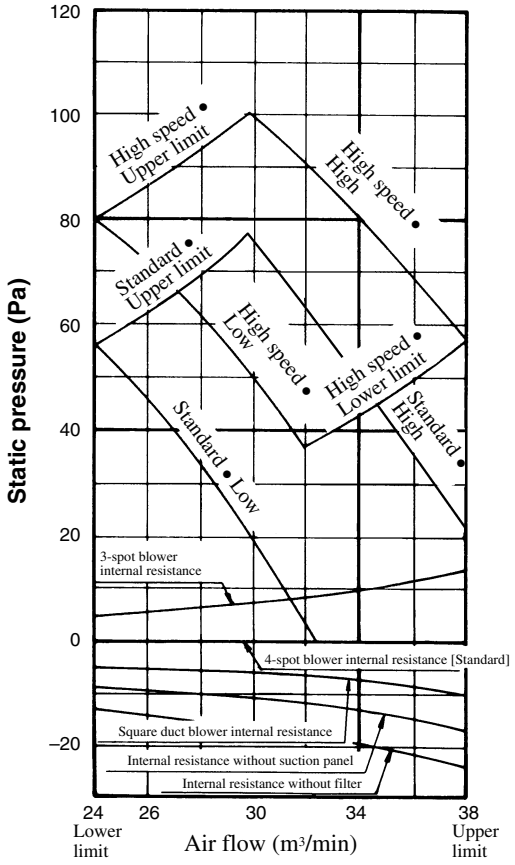
**Model FDR308-A**




**Model FDR408-A**

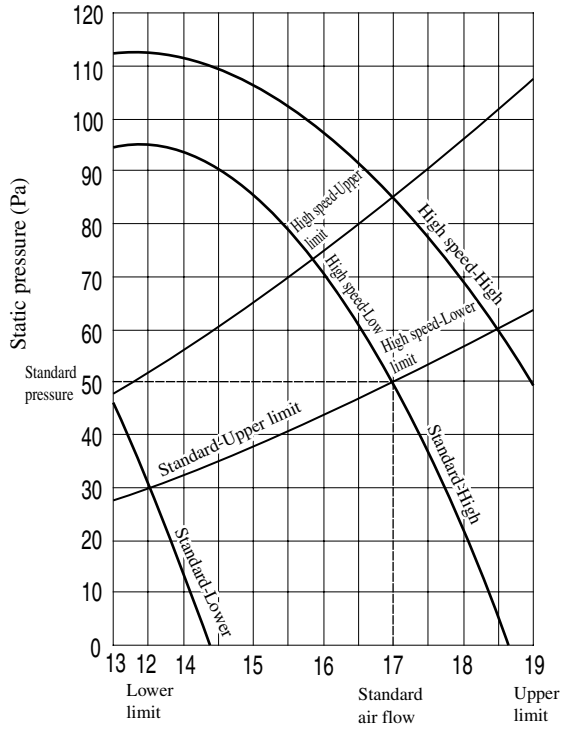



**Model FDR508-A**

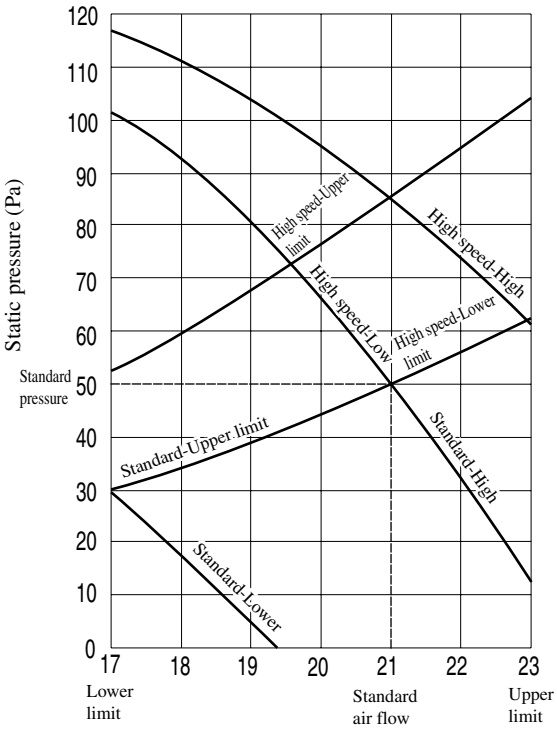


### (2) Ceiling mounted duct type (FDUR)

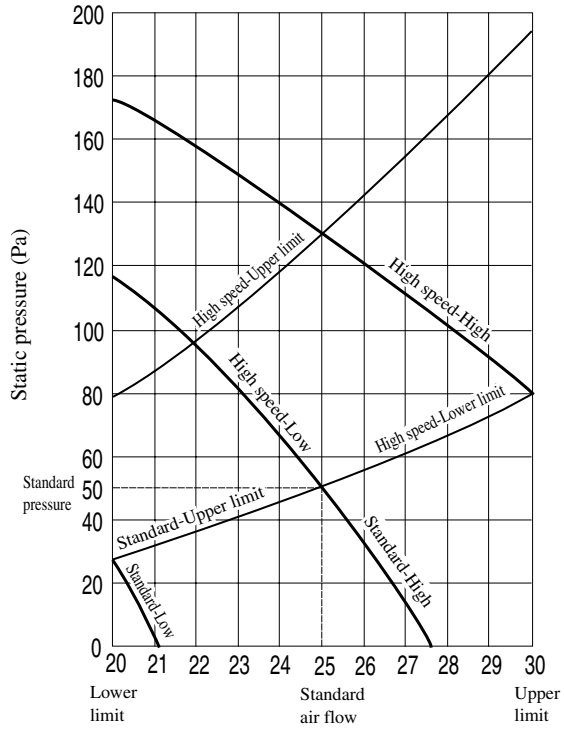
**Model FDUR208-A**



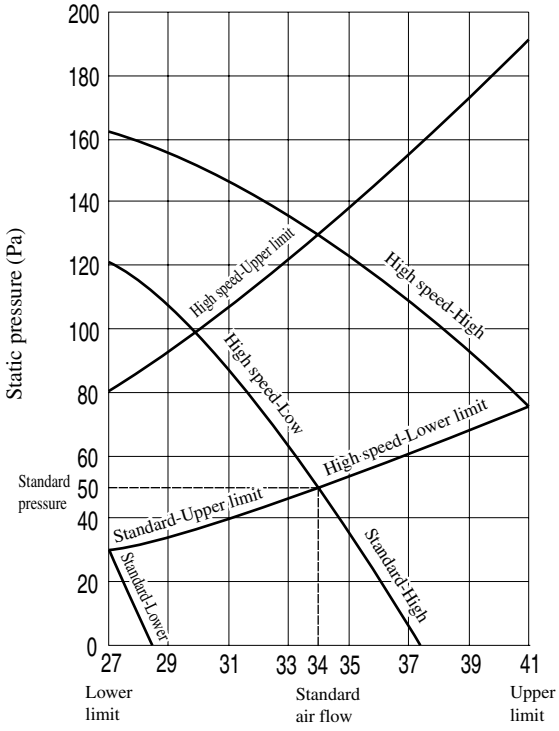

**Model FDUR258-A**



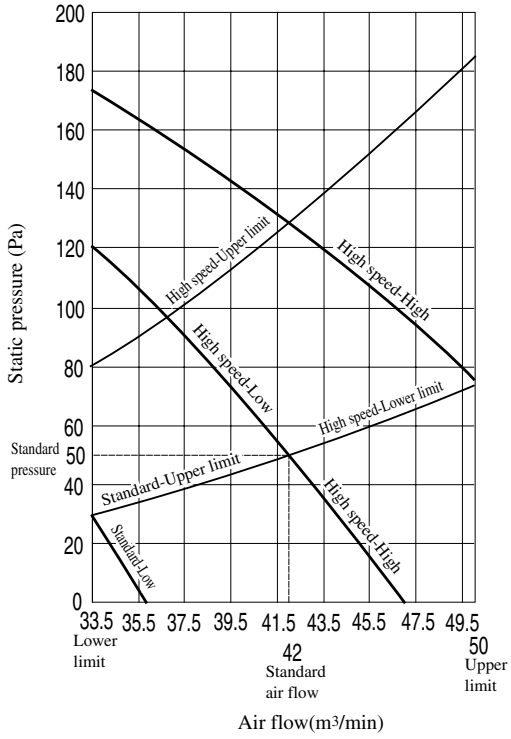

**Model FDUR308-A**




**Model FDUR408-A**



**Model FDUR508-A**




## 2.8 Noise level

Notes (1) The data are based on the following conditions.

Ambient air temperature:

Indoor unit 27˚C DB, 19˚C WB.

Outdoor unit 35˚C DB.

**Indoor unit**

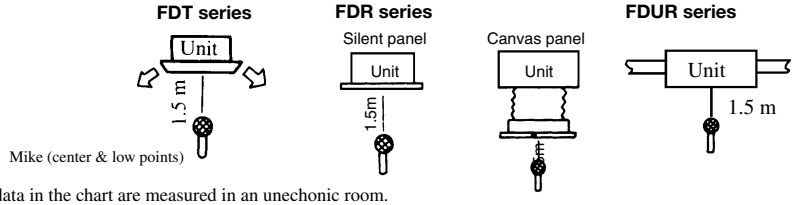
**Measured based on JIS B 8616**

Mike position as below

**Outdoor unit**

**Measured based on JIS B 8616**

Mike position: front height is 1 meter.




(2) The data in the chart are measured in an unechonic room.

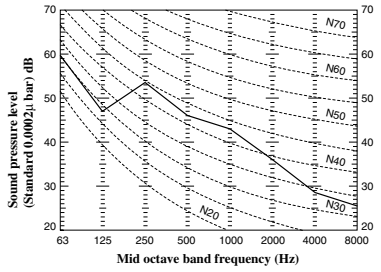
(3) The noise levels measured in the field are usually higher than the data because of reflection.

### (1) Indoor unit

#### (a) Ceiling recessed type (FDT)

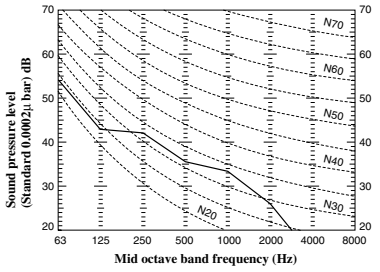
**Model FDT208-A**

**Noise level** 38 dB (A) at HIGH
33 dB (A) at LOW



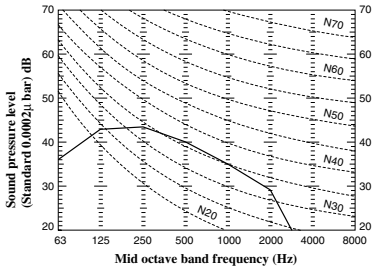

**Model FDT258-A**

**Noise level** 39 dB (A) at HIGH
35 dB (A) at LOW



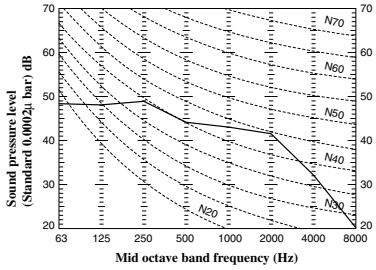

**Model FDT308-A**

**Noise level** 41 dB (A) at HIGH
35 dB (A) at LOW



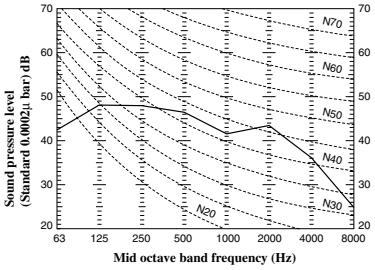
**Model FDT408-A**

**Noise level** 48 dB (A) at HIGH
40 dB (A) at LOW




**Model FDT508-A**

**Noise level** 49 dB (A) at HIGH
43 dB (A) at LOW

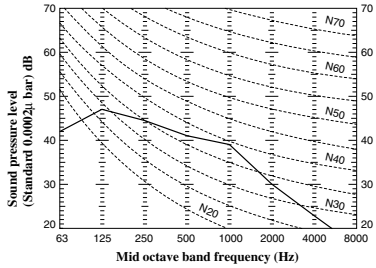



## (b) Cassetteria type (FDR)

### 1) Silent panel

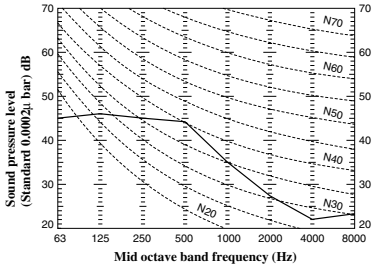
**Model FDR208-A**

**Noise level** 43 dB (A) at HIGH
37 dB (A) at LOW



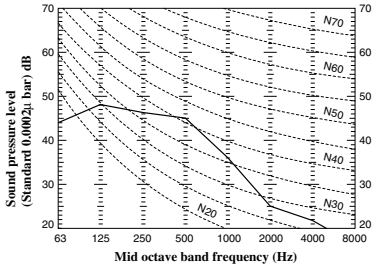

**Model FDR258-A**

**Noise level** 43 dB (A) at HIGH
37 dB (A) at LOW



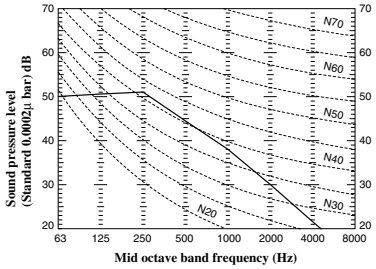

**Model FDR308-A**

**Noise level** 44 dB (A) at HIGH
38 dB (A) at LOW



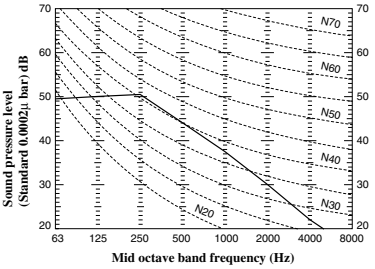

**Model FDR408-A**

**Noise level** 45 dB (A) at HIGH
38 dB (A) at LOW




**Model FDR508-A**

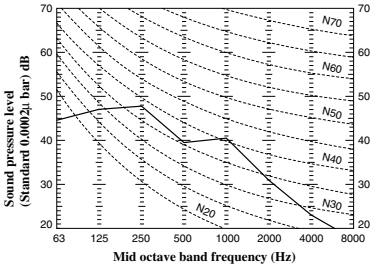
**Noise level** 46 dB (A) at HIGH
39 dB (A) at LOW




### 2) Canvas panel

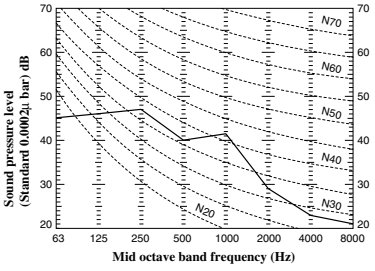
**Model FDR208-A**

**Noise level** 44 dB (A) at HIGH
38 dB (A) at LOW



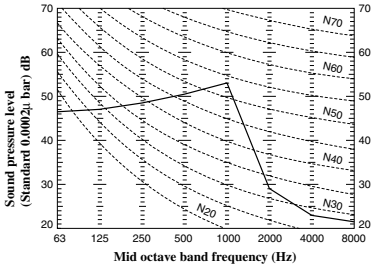

**Model FDR258-A**

**Noise level** 44 dB (A) at HIGH
38 dB (A) at LOW



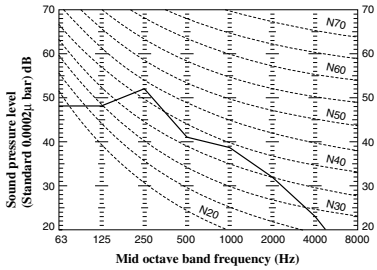

**Model FDR308-A**

**Noise level** 45 dB (A) at HIGH
39 dB (A) at LOW



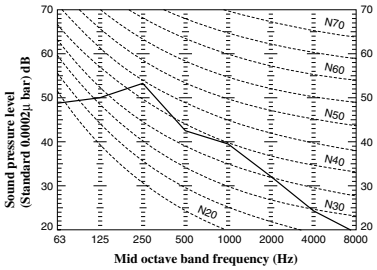
**Model FDR408-A**

**Noise level** 46 dB (A) at HIGH
39 dB (A) at LOW




**Model FDR508-A**

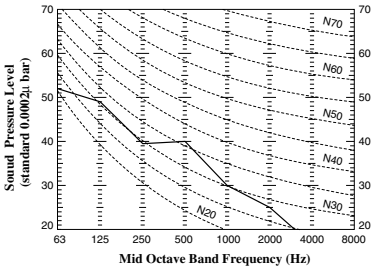
**Noise level** 47 dB (A) at HIGH
40 dB (A) at LOW




### (c) Ceiling mounted duct type (FDUR)

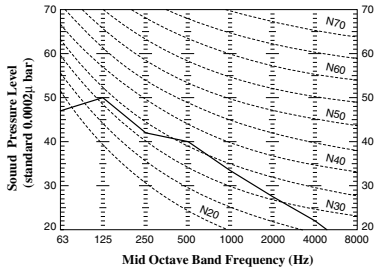
**Model FDUR208-A**

**Noise level** 40 dB (A) at HIGH
36 dB (A) at LOW



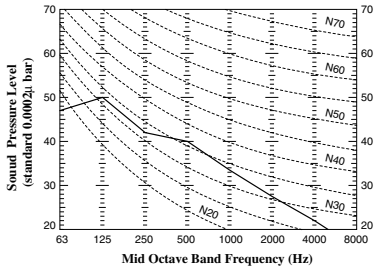

**Model FDUR258-A**

**Noise level** 41 dB (A) at HIGH
37 dB (A) at LOW



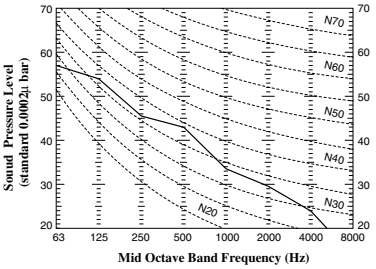

**Model FDUR308-A**

**Noise level** 41 dB (A) at HIGH
37 dB (A) at LOW



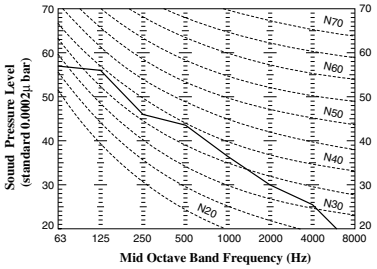

**Model FDUR408-A**

**Noise level** 44 dB (A) at HIGH
40 dB (A) at LOW




**Model FDUR508-A**

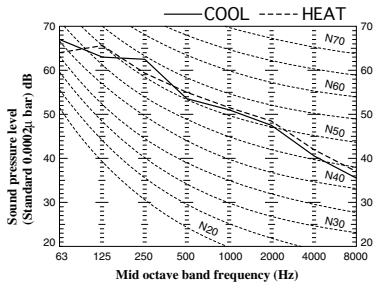
**Noise level** 45 dB (A) at HIGH
41 dB (A) at LOW




## (2) Outdoor unit

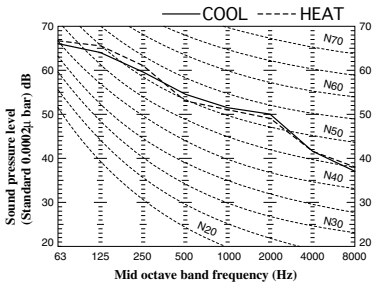
**Model FDCP808HES3**

**Noise level** 58 dB (A)




**Model FDCP1008HES3**

**Noise level** 58 dB (A)



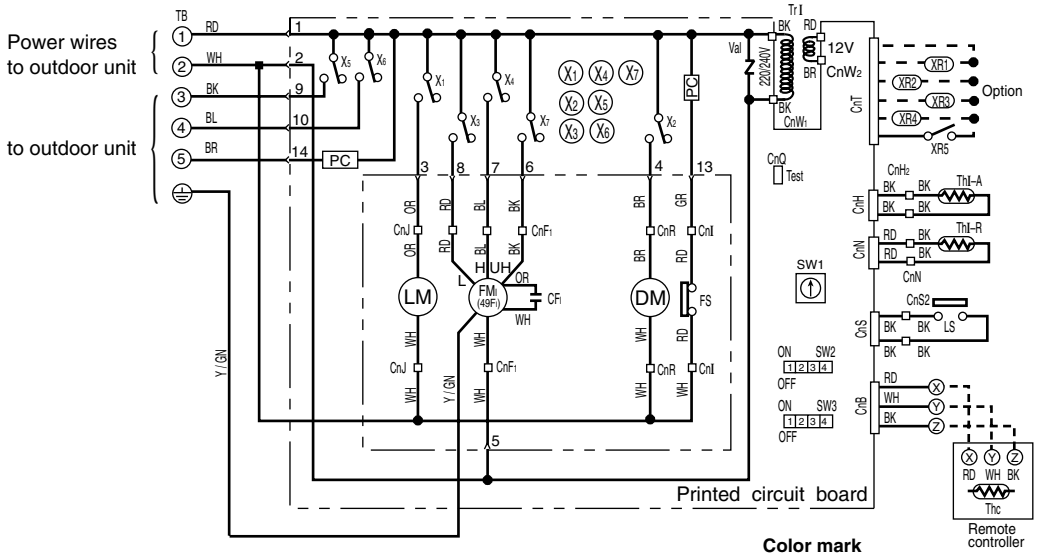
# 3 ELECTRICAL DATA

## 3.1 Electrical wiring

### (1) Indoor unit

#### (a) Ceiling recessed type (FDT)

**Models All models**




**Meaning of marks**

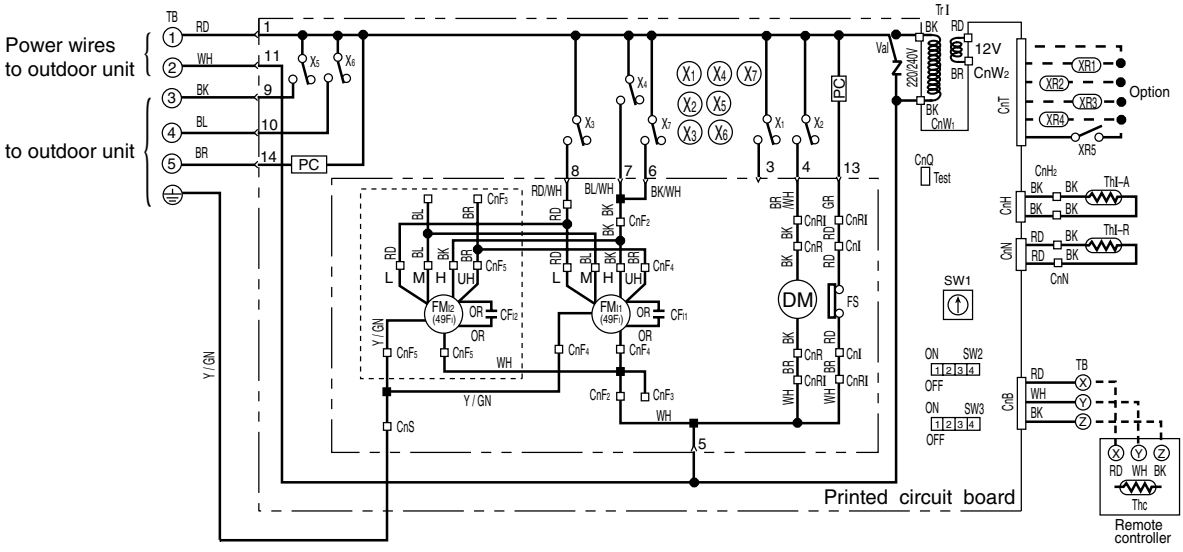
| Mark | Parts name | Mark | Parts name | Mark | Parts name |
|---|---|---|---|---|---|
| **FM1** | Fan motor (indoor unit) | **X1-7** | Auxiliary relay | **CnA-W** | Connector |
| **49F1** | Internal thermostat for FM1 | **Thc** | Thermistor | **TB** | Terminal block |
| **CF1** | Capacitor for FM1 | **ThI-A** | Thermistor | ■ | Connector |
| **LM** | Louver motor | **ThI-R** | Thermistor | ◁ | Terminal (F) |
| **LS** | Limit switch | **Tr1** | Transformer | **SW1** | Switch (Address set) |
| **DM** | Drain motor | **Va1** | Varistor | **SW2, 3** | Changeover switch |
| **FS** | Float switch | **PC** | Photo coupler | | |

**Color mark**

| Mark | Color |
|---|---|
| **BK** | Black |
| **BL** | Blue |
| **BR** | Brown |
| **GR** | Gray |
| **OR** | Orange |
| **RD** | Red |

#### (b) Cassetteria type (FDR)

**Models All models**




Note(1) "FM12" and the following wires (shown in [- - - -]) are equipped only for FDR408, 508.

**Meaning of marks**

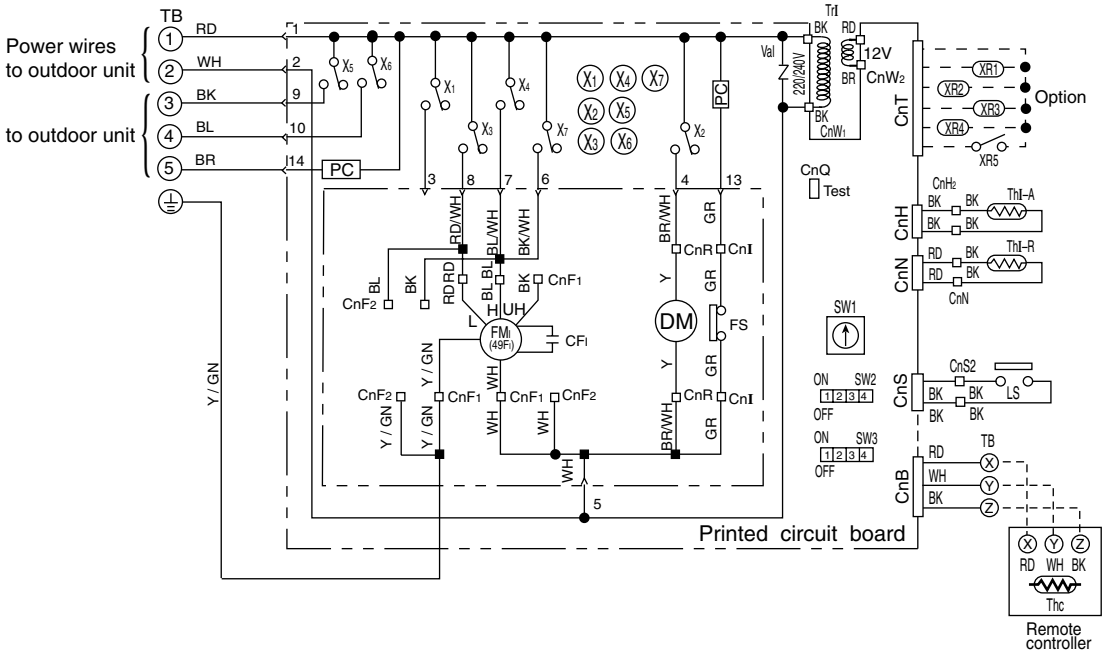
| Mark | Parts name | Mark | Parts name | Mark | Parts name |
|---|---|---|---|---|---|
| **FM11, 2** | Fan motor (indoor unit) | **Thc** | Thermistor | **CnA-W** | Connector |
| **49F1** | Internal thermostat for FM1 | **ThI-A** | Thermistor | **TB** | Terminal block |
| **CF11, 2** | Capacitor for FM1 | **ThI-R** | Thermistor | ■ | Connector |
| **DM** | Drain motor | **Tr1** | Transformer | ◁ | Terminal (F) |
| **FS** | Float switch | **Va1** | Varistor | **SW1** | Switch (Address set) |
| **X1-7** | Auxiliary relay | **PC** | Photo coupler | **SW2,3** | Changeover switch |

**Color mark**

| Mark | Color | Mark | Color |
|---|---|---|---|
| **BK** | Black | **WH** | White |
| **BL** | Blue | **Y/GN** | Yellow/Green |
| **BR** | Brown | **RD/WH** | Red/White |
| **GR** | Gray | **BL/WH** | Blue/White |
| **OR** | Orange | **BK/WH** | Black/White |
| **RD** | Red | **BR/WH** | Brown/White |

### (c) Ceiling mounted duct type (FDUR)

**Models All models**




**Meaning of marks**

| Mark | Parts name | Mark | Parts name |
|---|---|---|---|
| **FM** | Fan motor (indoor unit) | **Trı** | Transformer |
| **49Fı** | Internal thermostat for FMı | **Vaı** | Varistor |
| **CF** | Capacitor for FMı | **PC** | Photo coupler |
| **DM** | Drain motor | **CnA ~ W** | Connector |
| **FS** | Float switch | **TB** | Terminal block |
| **X1~7** | Auxiliary relay | ■ | Connector |
| **Thc** | Thermistor | ◁ | Terminal (F) |
| **Thı-A** | Thermistor | **SW1** | Switch (Address set) |
| **Thı-R** | Thermistor | **SW2, 3** | Changeover switch |

**Color mark**

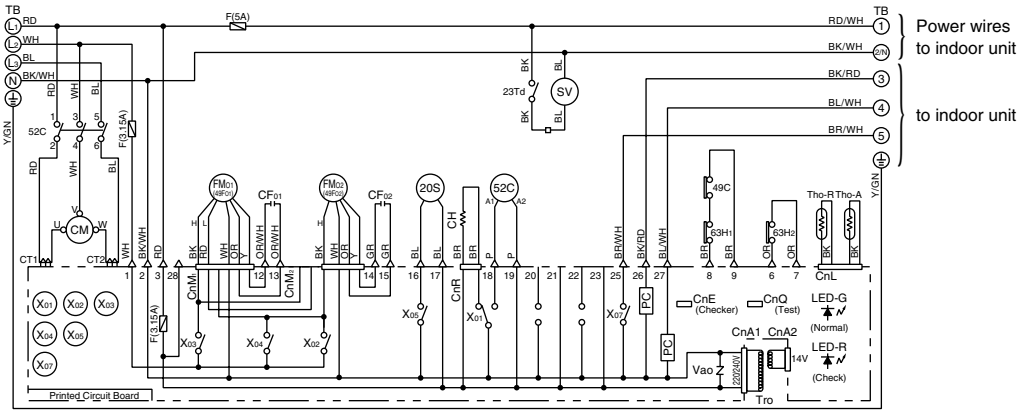
| Mark | Color | Mark | Color |
|---|---|---|---|
| **BK** | Black | **WH** | White |
| **BL** | Blue | **Y/GN** | Yellow/Green |
| **BR** | Brown | **RD/WH** | Red/White |
| **GR** | Gray | **BL/WH** | Blue/White |
| **OR** | Orange | **BK/WH** | Black/White |
| **RD** | Red | **BR/WH** | Brown/White |

## (2) Outdoor unit

**Models FDCP808HES3, 1008HES3**

**Power source**

**3Phase 380-415V 50Hz**




**Meaning of marks**

| Mark | Parts name | Mark | Parts name |
|---|---|---|---|
| **CM** | Compressor motor | **LED-R** | Indication lamp (Red) |
| **FMo1,2** | Fan motor (outdoor unit) | **CT1,2** | Current sensor |
| **52C** | Magnetic contactor for CM | **Tho-R** | Thermistor (outdoor H.Ex.temp.) |
| **49C** | Internal thermostat for CM | **Tho-A** | Thermistor (outdoor air temp.) |
| **49Fo1,2** | Intrnal themostat for FMo | **Tro** | Transformer |
| **CH** | Crankcase heater | **Vao** | Varistor |
| **CFo1,2** | Capacitor for FMo | **PC** | Photo coupler |
| **Xo** | Auxiliary relay | **CnA~R** | Connector |
| **63H1** | High pressure switch (for protection) | **TB** | Terminal block |
| **63H2** | High pressure switch (for control) | **SV** | Solenoid valve (for control) |
| **F** | Fuse | **23Td** | Thermostat |
| **LED-G** | Indication lamp (Green) | | |

**Color mark**

| Mark | Color | Mark | Color |
|---|---|---|---|
| **BK** | Black | **BK/RD** | Black/Red |
| **BL** | Blue | **BK/WH** | Black/White |
| **BR** | Brown | **BL/WH** | Blue/White |
| **GR** | Gray | **BR/WH** | Brown/White |
| **OR** | Orange | **OR/WH** | Orange/White |
| **P** | Pink | **RD/WH** | Red/White |
| **RD** | Red | **Y/GN** | Yellow/Green |
| **WH** | White | **Y** | Yellow |

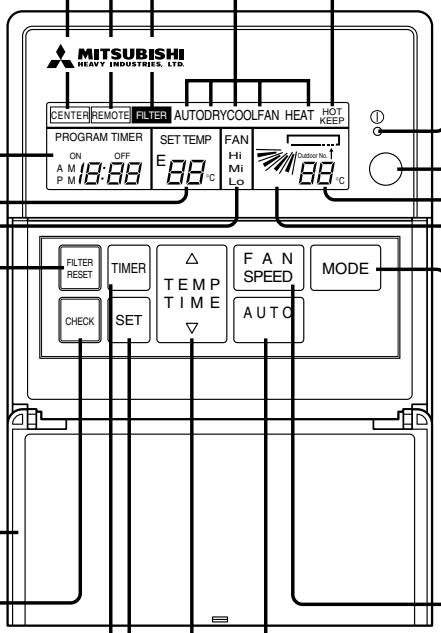
# 4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

### (1) Wired remote controller
### Models FDT, FDR, FDUR series

FDR and FDUR series are not provided with AUTO SWING switch.

Panel shown below will appear if you open the cover. All contents of display on the LCD are indicated simultaneously for the purpose of explanation.

Pull the knob on the cover to this side to open it downward.




**Filter sign**
When this sign is indicated, clean the filter.

**Remote display**
This is displayed when the unit is controlled with an individual controller during normal operation. (Also displayed when the air conditioner is stopped.)

**Central display**
This is displayed when the unit is controlled with the optional central console.

**Timer operation display**
Contents of timer operation are displayed. (Also displayed when the air conditioner is stopped.)

**Setting temperature display**
Displays the temperature that has been set.

**Fan speed display**
Displays the fan speed that has been set.

**Filter reset switch**
Use this switch to reset (erase) the filter sign display.
(Press the switch after cleaning the air filter.)

**Cover**

**Inspection switch**
Use this switch when servicing the unit.

**Timer switch**
Use this switch when selecting contents of timer operation.

**Set switch**
Use this switch to set a time for the timer.

**Operation mode display**
Displays the operation mode that has been selected.
(Cooling only air-conditioner has the display of "COOL" ,"DRY" and "FAN" only.)

**Heating preparation display**

**Operation/ Inspection indicator lamp**
During operation: Green lamp flashes.
In case of error: Red lamp flashes.

**On/Off switch**
Use this switch to start or stop the air conditioner.First push on the switch starts the unit and second push stops it. (The switch can be operated without opening the cover.)

**Return air temperature display**
Displays the return air temperature.

**Note**

Indicated value may be different from actual reading on a thermometer or other instrument but this is not necessarily an error.

**Auto swing display**
Indicates the swing louver condition.

**Mode switch**
Use this switch to select operation modes.

**Fan speed switch**
Use this switch to set a fan speed.

**Auto swing switch**
Use this switch to operate or stop the swing louver.

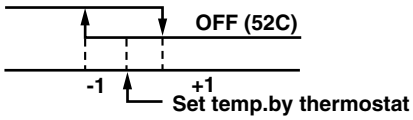
**Temperature/ Time setting switch**
Use this switch to set the room temperature or time on the timer.

## (2) Outline of microcomputer control function

### (a) Operation control function by the indoor controller

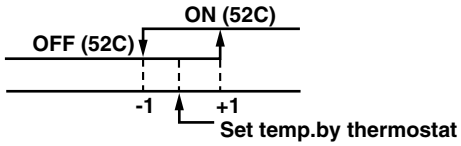
#### 1) Room temperature control (Differential of thermostat)

**Heating operation**




Temperature difference between thermostat set temp. and return air temp. (Detected by $Th_I$-A)

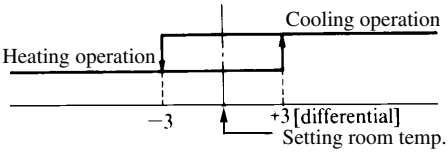
**Cooling operation**




Temperature difference between thermostat set temp. and return air temp. (Detected by $Th_I$-A)

#### 2) Automatic operation

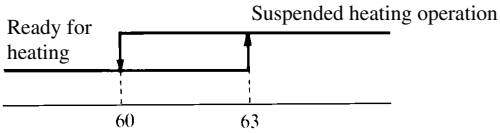
If the Auto mode is selected on the remote control device, the selection of cooling or heating can be made automatically depending on the room temperature (and the temperature of indoor heat exchanger). (When the switching between the cooling and the heating is made within 3 minutes, the compressor will not operate for 3 minutes.) This will make much easier the switching of cooling/heating at the change of season and can be adapted to the unmanned operation at bank cash dispenser.




Room temp. (detected at $Th_I$-A) [deg]

Notes (1) During the automatic switching of cooling/heating the room temperature is controlled based on the setting of room temperature.

(2) If the temperature of indoor heat exchanger rises beyond 63˚C during the heating operation, it is switched automatically to the cooling operation. For an hour after this switching, the heating operation is suspended regardless of the temperature as shown at left.




Indoor heat exchanger temperature (˚C)

#### 3) Control parts operation during cooling and heating

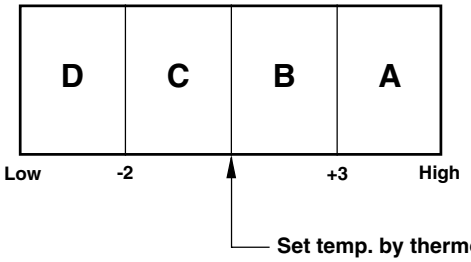
| Function / Control part | Cooling | | Fan | Heating | | | | Dry | |
|---|---|---|---|---|---|---|---|---|---|
| | Thermostat ON | Thermostat OFF | – | Thermostat ON | Thermostat OFF | Defrost | HOT START | Thermostat ON | Thermostat OFF |
| Compressor | ○ | × | × | ○ | × | ○ | ○ | ○ | × |
| 4-way valve | × | × | × | ○ | × | × | ○ | × | × |
| Outdoor fan | ○ | × | × | ○ | × | × | ○ | ○ | × |
| Indoor fan | ○ | | ○ | ○/× | | | | ○ | |
| Louver motor | ○/× | | | | | | | | |
| Condensate motor | ○ | ×(2min. ON) | ×(2min. ON) | ×(2min. ON) | | | | ○ | ×(2min. ON) |

Note (1) ○ :ON
× :OFF
○/× :According to control other than temperature control.

### 4) Dehumidifying operation ("THERMAL DRY")

The compressor, the indoor fan motor and the outdoor fan motor are operated intermittently under thermistor (Thı-A) control according to the appropriate operation block, to provide cooling operation for the dehumidifying.

**Operation block**




**Pattern of operation**

CM, FMo: ON  FMı: ON

| Operation block | Thermal drying starting (for 8 or 16 minutes after operation started) | Normal thermal dry operation (after completion of thermal drying) |
|---|---|---|
| A | (16 minutes) | (8 minutes) Continuous cooling operation (FMı:Lo) |
| B | • Cooling operation (Thermostat ON)<br>• Indoor fan operating with the setting air flow.<br>• When the thermostat is turned off, the indoor fan operates for 30 seconds with the Lo operation in the wind blowing mode and then stops. | (8 minutes)<br>CM, FMo<br>FMı<br>4 min. 4 min. 0.5 min. (FMı: Lo) |
| C | (8 minutes)<br>CM, FMo<br>FMı<br>5 min. 3 min. 0.5 min. (FMı: Lo) | (8 minutes)<br>CM, FMo<br>FMı<br>5 min. 3 min. 0.5 min. (FMı: Lo) |
| D | | (8 minutes) All stoppage |

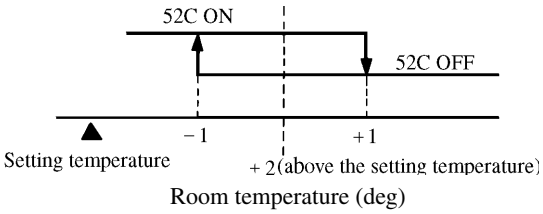
Notes (1) **Operation block ⒶⒷ : Normal cooling operation for 16 minutes after operation is started.**
Operation stops by thermostat when the set temperature is reached.
After 16 minutes, normal thermal drying operation starts.
**Operation block ⒸⒹ : Operation as above is performed for 8 minutes.**
After 8 minutes, normal thermal drying operation starts.

(2) **In normal operation, the temperature is checked at 8 minute intervals** after normal thermal drying operation is started, **to determine which operation block is to the selected.**
**Operation block Ⓐ thermal drying is carried out if the thermostat set temperature is constant.**

### 5) Hot spurt

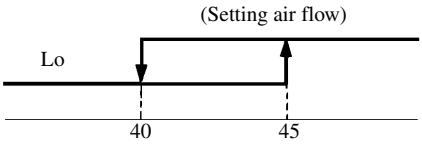
In the hot spurt mode, the control is conducted at the level +2 higher than the setting temperature at the start of heating operation.

The hot spurt is canceled either after the initial thermostat OFF, when the indoor heat exchanger temperature reaches 61˚C or 60 minutes after the start of the mode.



### 6) FM control with the heating thermostat turned off (For cold draft prevention)

In order to prevent a cold draft while the heating thermostat is turned off, the indoor blower is controlled in response to the temperature of the indoor heat exchanger as illustrated below. It should be noted that if SW3-4 on the indoor PCB is turned off, the indoor blower will stop so far as the temperature of the indoor heat exchanger is lower than 40˚C. It will be turned to the Lo operation 5 minutes later.



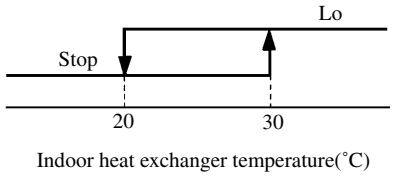

Note (1) After the thermostat is reset, it returns to the hot start control.

### 7) Hot start (Cold draft prevention during heating)

1) If the indoor heat exchanger temperature is lower than 30˚C when the heating operation has started, the following indoor blower control is performed.
   (1) In case of the thermostat off condition: Lo operation
   (2) In case of the thermostat on condition : Stop
   (3) If the indoor heat exchanger temperature exceeds 30˚C or 7 minutes after the beginning of hot start, the hot start terminates and it returns to the setting airflow of the blower.
2) If the indoor heat exchanger temperature is lower than 30˚C when the unit is heating under the thermo-ON condition, the indoor fan operates in the Lo mode. As the temperature rises higher than 30 ˚C or 7 minutes after the beginning of hot start, the hot start terminates and it returns to the setting air flow.

### 8) Indoor fan control during defrost operation

1) The indoor fan operation is changed from the setting airflow to the Lo operation 40 seconds before the start of defrost operation (when the defrost thermostat is turned ON) and stops if the indoor heat exchanger temperature drops below 20˚C.
2) After the stop as described in 1)-above, the control will be conducted as illustrated below depending on the indoor heat exchanger temperature.




3) If the indoor heat exchanger temperature rises beyond 30˚C of 7 minutes after the end of defrosting, the indoor fan control related to the defrosting is completed.

### 9) Condensate pump motor (DM) control

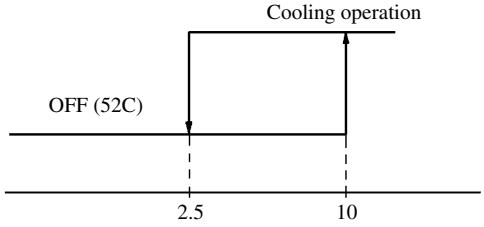
During the cooling or Dehumidifying operation, the condensate pump motor (DM) is synchronized with the start of compressor operation. If the operation is switched from the operation stop, error stop, thermostat stop and the cooling of defrosting operation to the fan or heating operation, the drain motor continues to operate for 2 minutes after the switching.

Overflow detection by means of the float switch is always on regardless of the operation mode. If an overflow occurs (or the float switch is not connected or the wire is broken), the operation is interrupted as the error stop and the drain motor is operated until the state of float switch is normalized.

### 10) Frost prevention during cooling

In order to prevent the frosting during cooling operation, the temperature of indoor unit heat exchanger (detected by THI-R) is checked 9 min, after the compressor operation start and the unit operation.

This cycle is not operated for 9 min. after the resetting of this frost prevention mechanism.




Indoor heat exchanger temperature (˚C)

### 11) Compressor inching prevention control

a) Compressor 3 minutes delay control

The compressor will remain in stop state for three minutes. When the compressor is stopped by thermostat, ON/OFF switch, and/or by occurrence of trouble.

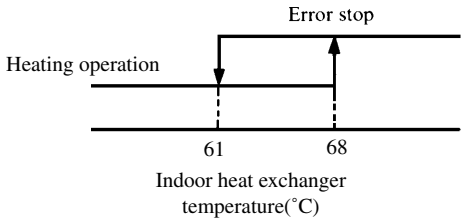
b) Compressor 3 minutes forced operation control

Compressor cannot be stopped for 3 minutes after it started. However, it will be stopped immediately when the thermostat is turned off due to the operation stop initiated by the ON/OFF switch or the change of operation mode.

Note (1) Both the error control and the protective control take priority over this control.

### 12) Overload protection during heating

If an overload condition has been detected by the indoor heat exchanger temperature and it has continued for more than 2 seconds during heating, the compressor is stopped. The compressor is started after a delay of 3 minutes and, if the overload condition is detected again whithin 60 minutes after the initial detection, the compressor is stopped with the error stop.




### 13) Automatic restart control

If there is interruption of power while the unit is operating, the unit operates after power restoration under the same condition as prior to the power interruption. However the compressor will only be able to start three minutes after the power restoration. Furthermore, if the timer was operating prior to the power interruption, the unit remains stopped even after the restoration of service.

Note (1) Becomes invalid if the dip switch SW3-1 on the indoor PC board is at OFF (SW3-1 is set at ON when unit is shipped from the factory).

### 14) Thermistor disconnection detection control

a) Detection of indoor return air thermistor disconnection

- If there is detection of a disconnection on the return air thermistor in 10 seconds after turning the power ON, the compressor is stopped. If there is a second disconnection on the return air thermistor detected within 60 minutes, there is emergency stop.

Note (1) If the first disconnection on the return air thermistor is detected for a period of 6 continuous minutes, there is emergency stop. If there is no detection of a second disconnection on the return air thermistor whithin 60 minutes, the first detection becomes invalid.

b) Detection of heat exchanger thermistor disconnection

- If a disconnection is detected on the heat exchanger thermistor in 20 seconds after the compressor has been operating for 2 minutes, the compressor is stopped. If a second disconnection on the heat exchanger thermistor line is detected within 60 minutes, there is emergency stop.

Note (1) If the first disconnection on the heat exchanger thermistor is detected for a period 6 continuous minutes, there is emergency stop.
If there is no detection of second disconnection on the heat exchanger thermistor within 60 minutes, the first detection becomes invalid.

**15) Drain detection**

a) If there is detection of a drain abnormality during cooling operation, the drain pump goes ON for 5 minutes and the compressor which had been running comes to a stop.
Overflow detection is carried out at all times with the float switch regardless of operational mode. If an overflow is generated (or if the float switch is not yet connected or has been disconnected). there is emergency stop (E9 is displayed) the drain motor operates until reset of the float switch.

b) If a drain abnormality is detected during cooling operation, there is emergency stop (E9 is displayed) to stop the compressor, and the drain pump is operated with the drain motor until reset of the float switch.

c) If a drain abnormality is detected during a stop state or fan operation, there is forced operation of the drain pump for 5 minutes. After 5 minutes have elapsed, the drain motor stops if the float switch is reset. Otherwise, there is emergency stop (E9 is displayed) and the drain motor operates until the float switch is reset.

d) If the float switch is not connected or if there is a disconnection, there is emergency stop.

**16) Low voltage guard control**

If the power source voltage remains at a value of 80% of rating or less for 3 continuous minutes during operation of the compressor, the compressor stops (52C OFF). Furthermore, if the power source voltage remains at a figure of 15% of rating or greater after 3 minutes have elapsed since stopping the compressor, there is restarting of the compressor (52C ON). Moreover, during stoppage of the compressor.

Note (1) When starting the compressor for the first time after turning the operational switch ON, there is starting regardless of the power source voltage. Furthermore, if dip switch SW 3-2 on the internal substrate is OFF, this becomes invalid. (Switch SW 3-2 is set to ON upon shipment from the factory).

**17) Refrigerant shortage error**

When 52C is ON when operating in cooling (including automatic cooling), if heat exchanger sensor temperature for the indoor unit (Thı -R) does not drop to 25 °C or less for 40 minutes  5 minutes or more after the start of operation, an abnormal stop due to insufficient refrigerant is performed.

**18) External control (remote display)/control of input signal**

**a) External control (remote display) output**

**Following output connectors (CNT) are provided on the control circuit board of indoor unit.**

- Operation output: Power to engage DC 12V relay (provided by the customer) is outputted during operation.
- Heating output: Power to engage DC 12V relay (provided by the customer) is outputted during the heating operation.
- Compressor ON output: Power to engage DC 12V relay (provided by the customer) is outputted while the compressor is operating.
- Error output: When any error occurs, the power to engage DC 12V relay (provided by the customer) is outputted.

**b) Control of input signal**

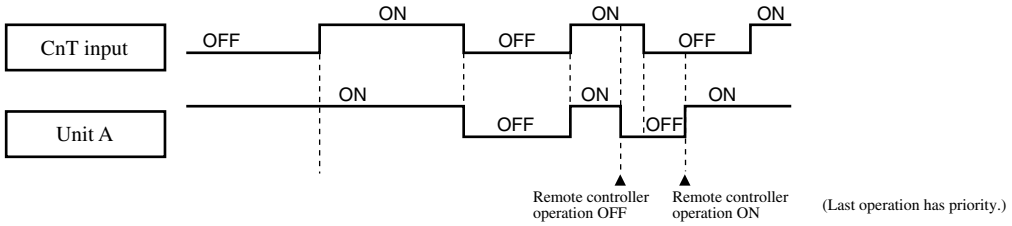
(Make sure to connect the standard remote control unit. Control of input signal is not available without the standard remote control unit.)

Control of input signal (switch input, timer input) connectors (CNT) are provided on the control circuit board of the indoor unit.

However, when the operation of air conditioner is under the Center Mode, the remote control by CnT is invalid.

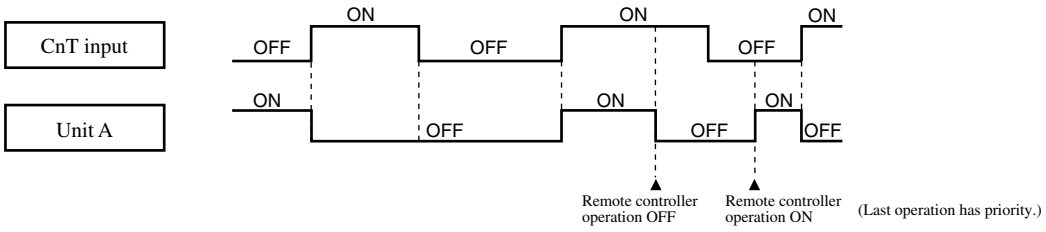
♦ At shipping from factory (J5 (SW5-2) on PCB OFF)

- Input signal to CnT OFF → ON [Edge input] ... Air conditioner ON
- Input signal to CnT ON → OFF [Edge input] ... Air conditioner OFF




♦ When J5 (SW5-2) on the PCB of indoor unit is turned on at the field.

Input signal to CnT becomes Valid at OFF Æ ON only and the motion of air conditioner [ON/OFF] is inverted.




**19) Auto Swing Control (Only FDT models)**

- Have a louver motor to move the louvers up and down for the so called “auto swing” function.
- The louver auto swing starts when the AUTO SWING key is pressed once and stops when the AUTO SWING key is pressed again. The louver position is displayed on the LCD on the remote controller. During auto swing, the position displayed on the LCD changes, but the positions of the louvers and the display are not coordinated. (The louvers swing 3 - 4 ti))mes per minute but the display changes once per second.)
- **Stopping the louvers**

  When the AUTO SWING key is pressed to stop the louver movement, the LCD louver-position display stops and the louvers stop when they come to the position displayed on the LCD. There are four louver stop position on the LCD. (When jumper wire J3 on the indoor unit printed circuit board is cut, the louvers stop immediately at the AUTO SWING key is pressed to stop them and the LCD display changes to show this position.
- **Movement of louver when the power supply to the controller controlling 4 positions of the louver is switched on.**

  When power supply is switched on, the louver will automatically swing about 2 times (without operating remote controller). This is an action for the microcomputer to confirm the louver position in order to input the cycle of the louver motor (LM) to the microcomputer with the limit switch (LS) pushing the louver motor (LM). If the LS action is not input to the microcomputer, the louver will stop within 1 minute after the power supply is switched on and will not move from then on.

- **Keeping the louvers horizontal during heating**

  While HOT KEEP is displayed (during hot start operation or when the thermostat has turned off during heating operation), the louvers stay in the horizontal position to prevent cold drafts, independent of the setting of the AUTO SWING key (auto swing or stop). The louver position display of LCD displays continuously the original position before this control operation.

  When the HOT KEEP display goes out, both the louvers and the LCD display return to their previous position. (However, after the power supply to the unit is switched on, the louvers swing two times as a check of the power source frequency, regardless of the settings of the ON / OFF or AUTO SWING keys).

## 20) Using 1 remote controller to control multiple units (indoor units - up to 16 units)

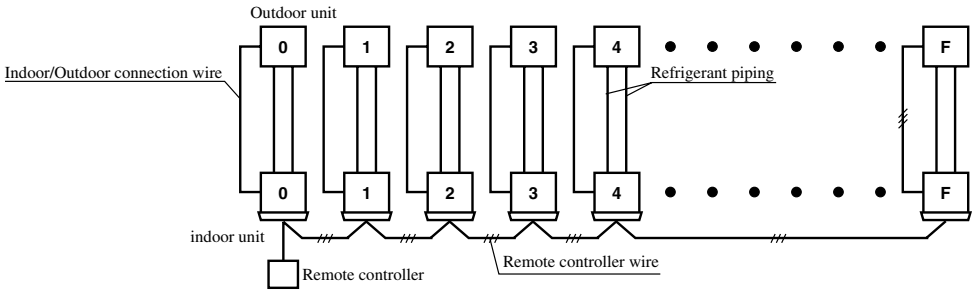
### a) Function

A single remote control switch can be used for group control of multiple units (indoor units - up to 16 units). All units in the group that have had the remote control switch set at [Operating Mode] can be turned on and off in order of the unit number.

This functions independently of the thermostat and protection functions of each unit.

Notes (1) The unit number is set by a switch (SW1) on the circuit board for the indoor unit.

Set SW1 : 0~9, A~F




(2) If unit number is not important, random can be used. However, setting in order from 0, 1, 2, to F will ensure setting without error.

### b) Display to remote controller

**(i) Return air temperature, by remote or center and heating preparation:** Displays for the youngest unit for the remote mode (center mode if there is no remote mode) of the units in operation.

**(ii) Inspection and filter sign:** Displays either to the first corresponding unit.

### c) Confirmation of connected units

Each push of the inspection switch on the remote control displays the units connected in sequential order from the youngest unit.

### d) Error

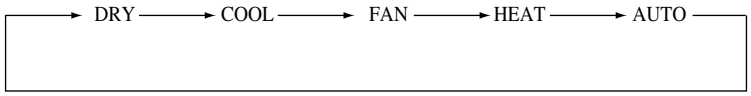
**(i)** If an error occurs (protection device activation) with some of the units in the group, those units will have an error stop, but the properly operating units will continue operation.

**(ii) Wiring outline**

Route the wire connecting each of the indoor and outdoor units as it would be for each unit. Use the terminal block (X, Y, Z) for the remote control for the group controller and use a jumper wire among each of the rooms.

**(b) Operation control function by the wired remote controller**

**(i) The following is the sequence of operation for the remote controller operation mode switch.**



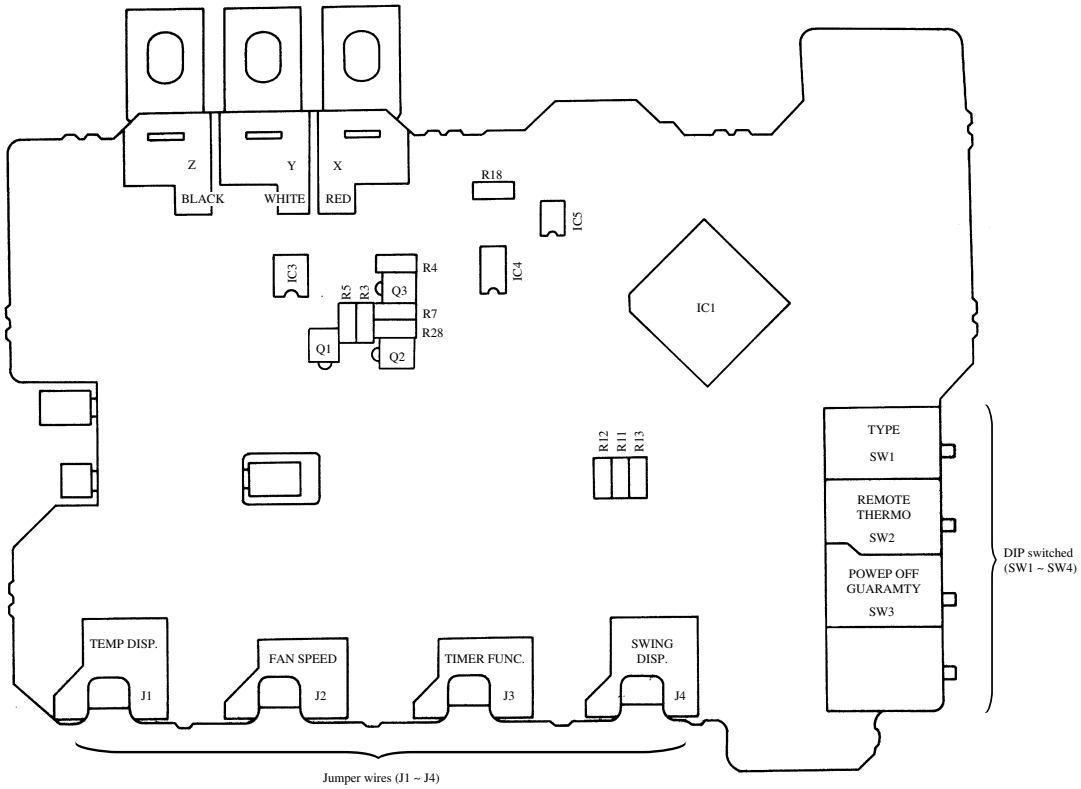

**(ii) CPU reset**

This functions when the " inspection " and " filter reset switch " on the remote controller are pushed simultaneously. It operates in the same manner as the power reset.

**(iii) Power outage compensation function.**

- This is enabled by setting dip switch SW3 on the remote control circuit board to ON.
- It records the normally used remote control modes. Once power has been restored, it restarts operation by using the contents of the memory. Note that the stop positions for auto swing and the timer mode are cancelled.

**Parts layout on the remote controller PCB**




• Function of DIP switched

| Switch | | Function |
|---|---|---|
| SW1 | ON | Cooling only type |
| | OFF | Heat pump type |
| SW2 | ON | Remote control sensor - Enabled |
| | OFF | Remote control sensor - Disabled |
| SW3 | ON | Power outage compensation - ON |
| | OFF | Power outage compensation - OFF |

• Function of Jumper wires

| Switch | | Function |
|---|---|---|
| J1 | Wich | Inlet temperature display - Enabled |
| | None (1) | Inlet temperature display - Disabled |
| J2 | Wich | Fan display - 3 speeds |
| | None (1) | Fan display - 2 speeds |
| J3 | Wich | Timer function - Enabled (Normal) |
| | None (1) | Timer function - Disabled |
| J4 | Wich | Auto swing display - ON |
| | None (1) | Auto swing display - OFF |

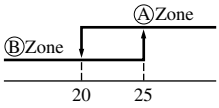
Note (1) 'None' means that jumper wire is not provided on the PCB or the connection ic cut.

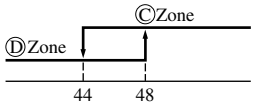
### (c) Operation control function by the outdoor controller

#### 1) Control for outdoor unit fan

##### a) Cooling Operation

The speed of the fan for the outdoor unit is controlled by the temperature of the heat exchanger (Tho-R detection) and the outdoor air temperature (Tho-A).




Description of control for fan for outdoor unit

| Fan motor | | | FM01(Left) | FM02(Right) |
|---|---|---|---|---|
| Zone | Ⓐ Zone | | Hi | Hi |
| | Ⓑ Zone | Ⓒ Zone | Hi | OFF |
| | | Ⓓ Zone | Lo | OFF |

##### b) Heating Operation

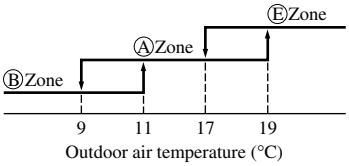
① Stop control for outdoor fan

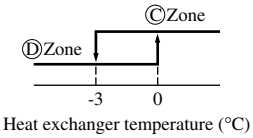
When the high pressure switch (63H2) operates, the fan for the outdoor unit is stopped to control the high pressure switch.

63H2 settings : 2.79 OFF/2.26 ON (Mpa)

② Tap control for outdoor fan

When the high pressure switch (63H2) is closed, the outdoor fan is controlled by the detected heat of the outdoor heat exchanger thermistor (Tho-R) and the detected heat of the outdoor air temperature thermistor (Tho-A).



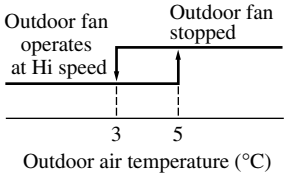

Description of control for fan for outdoor unit

| Fan motor | | | FM01(Left) | FM02(Right) |
|---|---|---|---|---|
| Zone | Ⓐ Zone | Ⓒ Zone | Hi | OFF |
| | | Ⓓ Zone | Hi | Hi |
| | Ⓑ Zone | | Hi | Hi |
| | Ⓔ Zone | Ⓒ Zone | Hi | OFF |
| | | Ⓓ Zone | Hi | Hi |

Note (1) When the fan for the outdoor unit is started when the outdoor air temperature is more than 12 °C, it will operate at high speed for 3 seconds and then switch to low speed. After operating a low speed for 4 minutes, it will be transferred to controlled speed.

#### 2) Snow protection fan control

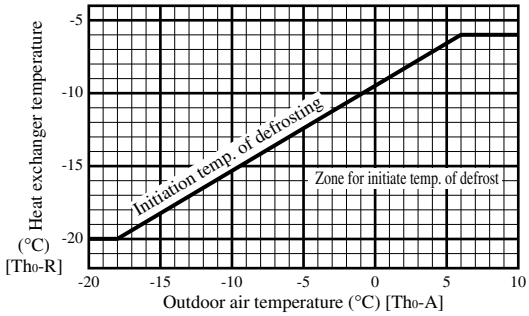
If DIP switch SW5-2 on the printed circuit board for the outdoor unit is set to on, the fan on the outdoor unit which has been stopped will operate for 10 seconds at Hi speed every 10 minutes when the outdoor air temperature is 3 °C or less.



### 3) Defrost control (Only heat pump type)

Defrost operation will start when the temperature of the heat exchanger for the outdoor unit (Tho-R detection) and the outdoor air temperature (Tho-A detection) enter the start of defrost range shown in the figure below.

**Initiation temp. of defrosting (Detected by Tho-R, Tho-A)**




Note (1) If DIP switch SW5-1 on the printed circuit board for the outdoor unit is set to on, defrost operation will begin when temperature of the heat exchanger for the outdoor unit reaches -7 °C.

#### a) Defrost finished

(i) Once defrost operation has started, it will finish after the cumulative operating time of the compressor has reached 12 minutes (factory setting: SW5-1 OFF).

Note (1) This time will become 14 minutes if the DIP switch (SW5-1) on the printed circuit board on the outdoor unit is set to on.

(ii) Patterns of defrost control can be changed by changing the setting of J18 on the PCB of outdoor unit.

- J18 (SW6-2) with: Normal defrost control
- J18 (SW6-2) none: Forced defrost control

### 4) Compressor protecting function (Microcomputer and phase protection relay)

#### a) Overcurrent control

(i) When a 52C secondary L1-phase continues for 0.5 seconds and when it is more than the set value (detection at current sensor CT), the compressor is stopped. The compressor is restarted after a 3-minute delay if the detection current is less than 1.5 to 2A. If this condition is re-detected 5 times within 60 minutes of the first occurrence, an abnormal stop of the unit is performed.

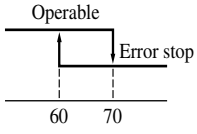
(ii) If 60 minutes passes and the detected current after the first to the fourth stoppage is not less than 1.5~2A, an abnormal stop of the unit is performed.

#### b) Open-phase protection

When a 52C secondary detection current continues for 4 seconds when the compressor is on and when it is less than 1.5 to 2 A, it is determined to be a open-phase of the 52C secondary N-phase, and the compressor is stopped. The compressor is restarted after a 3-minute delay and if this condition is re-detected within 60 minutes of the first occurrence, an abnormal stop of the unit is performed.

#### c) Cooling overload protection

State of overload during cooling operation is detected (with Tho-R) based on the temperature of outdoor heat exchanger and the unit operation is stopped / Immediate reset after repair




#### d) Thermistor (Heat exchanger and outdoor air thermistor) disconnected wire

(i) If there is a disconnected wire or if there is a big difference in performance characteristics, an abnormal stop of the unit is performed. ⇨ Restore after repairing.

**5) Abnormal high-pressure protection**

a) If the pressure rises and 63H1 is operated (opened), the compressor is stopped. After a 3-minute delay, the compressor is restarted. An abnormal stop is performed when 63H1 is opened 5 times within 60 minutes of the first operation. ⇨ Restore after repairing.

b) An abnormal stop is performed at the first occurrence if 63H1 remains open after 60 minutes have passed from the first time the compressor was stopped.

Note (1) Once 63H1 has been restored after an abnormal stop, the unit can be restarted using the remote control.

**6) Compressor motor protection**

The same detection control as 63H1 will be performed when the internal thermostat 49C operates due to a rise in the windings of the compressor motor. The setting values of the internal thermostat 49C are 90 °C open and 73 °C close.

**7) Control of the closing and opening of the service valve**

a) When the compressor is ON for the first time after turning on the power, the heating operation starts regardless of any setting.

b) If the 63H2 turns OFF(open) within 10 seconds after the compressor is ON, the power will turn off as abnormal stop.

c) To recover from the abnormal stop, turn on the power again after the 63H2 is ON(closed).

d) If the 63H2 doesn't turn OFF(open) within 10 seconds after the compressor is ON, the operation immediately changes to the “set mode” to start normal operation.

**8) Test run**

a) For a test run, it is possible to use the dip switches SW5-3 and SW5-4 on the printed circuit board in the outdoor unit.

<table>
<tr><td rowspan="3">SW5-3</td><td rowspan="2">ON</td><td rowspan="2">SW5-4</td><td>OFF</td><td>Test run for cooling</td></tr>
<tr><td>ON</td><td>Test run for heating</td></tr>
<tr><td>OFF</td><td colspan="3">Normal</td></tr>
</table>

b) Test run time is 30 minutes. Protective devices are effectively controlled.

# 5 APPLICATION DATA

# SAFETY PRECAUTIONS

- Please read these "Safety Precautions" first then accurately execute the installation work.
- Though the precautionary points indicated herein are divided under two headings. ⚠WARNING and ⚠CAUTION, those points which are related to the strong possibility of an installation done in error resulting in death or serious injury are listed in the ⚠WARNING section. However, there is also a possibility of serious consequences in relationship to the points listed in the ⚠CAUTION section as well.
  In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.
- After completing the installation, along with confirming that no abnormalities were seen from the operation tests, please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the owner's manual.
  Moreover, ask the customer to keep this sheet together with the owner's manual.

## ⚠WARNING

- This system should be applied to places of office, restaurant, residence and the like. Application to inferior environment such as engineering shop could cause equipment malfunction.
- Please entrust installation to either the company which sold you the equipment or to a professional contractor. Defects from improper installations can be the cause of water leakage, electric shocks and fires.
- Execute the installation accurately, based on following the installation manual. Again, improper installations can result in water leakage, electric shocks and fires.
- When a large air-conditioning system is installed to a small room, it is necessary to have a prior planned countermeasure for the rare case of a refrigerant leakage, to prevent the exceeding of threshold concentration. In regards to preparing this countermeasure, consult with the company from which you perchased the equipment, and make the installation accordingly. In the rare event that a refrigerant leakage and exceeding of threshold concentration does occur, there is the danger of a resultant oxygen deficiency accident.
- For installation, confirm that the installation site can sufficiently support heavy weight. When strength is insufficient, injury can result from a falling of the unit.
- Execute the prescribed installation construction to prepare for earthquakes and the strong winds of typhoons and hurricanes, etc. Improper installations can result in accidents due to a violent falling over of the unit.
- For electrical work, please see that a licensed electrician executes the work while following the safety standards related to electrical equipment, and local regulations as well as the installation instructions, and that only exclusive use circuits are used.
  Insufficient power source circuit capacity and defective installment execution can be the cause of electric shocks and fires.
- Accurately connect wiring using the proper cable, and insure that the external force of the cable is not conducted to the terminal connection part, through properly securing it. Improper connection or securing can result in heat generation or fire.
- Take care that wiring does not rise upward, and accurately install the lid/service panel. Its improper installation can also result in heat generation or fire.
- When setting up or moving the location of the air-conditioner, do not mix air etc. or anything other than the designated refrigerant within the refrigeration cycle.
  Rupture and injury caused by abnormal high pressure can result from such mixing.
- Always use accessory parts and authorized parts for installation construction. Using parts not authorized by this company can result in water leakage, electric shock, fire and refrigerant leakage.

## ⚠CAUTION

- Execute proper grounding. Do not connect the ground wire to a gas pipe, water pipe, lightning rod or a telephone ground wire. Improper placement of ground wires can result in electric shock.
- The installation of an earth leakage breaker is necessary depending on the established location of the unit. Not installing an earth leakage breaker may result in electric shock.
- Do not install the unit where there is a concern about leakage of combustible gas.
  The rare event of leaked gas collecting around the unit could result in an outbreak of fire.
- For the drain pipe, follow the installation manual to insure that it allows proper drainage and thermally insulate it to prevent condensation. Inadequate plumbing can result in water leakage and water damage to interior items.

## 5.1 Installation of indoor unit

**⚠NOTICE**

**All Wiring of this installation must comply with NATIONAL, STATE AND LOCAL REGULATIONS.** These instructions do not cover all variations for every kind of installation circumstance. Should further information be desired or should particular problems occur, the matter should be referred to Mitsubishi Heavy Industries, Ltd. through your local distributor.

**⚠WARNING**

BE SURE TO READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE SERIOUS INJURY OR DEATH, EQUIPMENT MALFUNCTION AND/OR PROPERTY DAMAGE.

**Ceiling recessed type (FDT)**

### (1) Selection of installation location

(a) Select location where the space above ceiling is larger than those mentioned below and perfect draining can be assured.

(b) Places where perfect drainage can be prepared and sufficient drainage gradient is available.

(c) Places free from air distrubances to the air inlet and outlet of the indoor unit.

(d) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%.(When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)

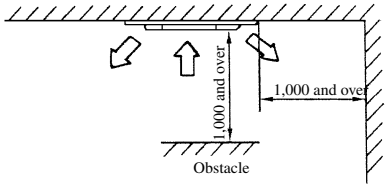
(e) Do not place where the unit is exposed to oil splashes or steam (e.g. kitchens and machine plants). (Installation and use at such places will causes the performance drop, corrosion in the heat exchanger and damage in molded synthetic resin parts.)

(f) Do not place where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

(g) Do not place adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals,
Generated noise may cause malfunctioning of the controller.

| Model | Space above ceiling |
|---|---|
| **FDT208** | Over 225 mm |
| **FDT258, 308** | Over 270 mm |
| **FDT408, 508** | Over 330 m**m** |

● **Installation space** (mm)




### (2) Preparation for installation

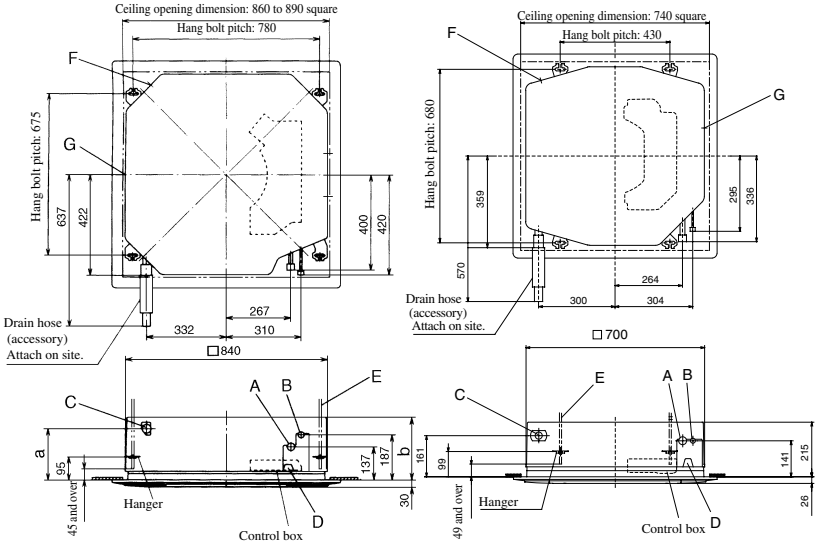
(a) Ceiling hole size and Position of suspension bolts.

1) The pattern sheet may shrink or expand as humidity changes, so check the actual size before use.

2) The size of ceiling opening can be adjusted within the range shown below. Bring the unit body to the ceiling opening right in the center so as not to be set aside and so that space between a ceiling opening end and the outside of the unit body becomes equal to that on the opposite side.

3) The size of the pattern sheet equals to the maximum size of the square ceiling opening.

(b) Location of Pipes
For the location of pipe, see the exterior dimension.




FDT258~508 FDT208

| | |
|---|---|
| A | Gas refrigerant piping |
| B | Liquid refrigerant piping |
| C | Drain piping connecting hole |
| D | Power intake hole |
| E | Hang bolt |
| F | Outside air intake hole |
| G | Supply air branch duct connecting hole |

Unit: mm

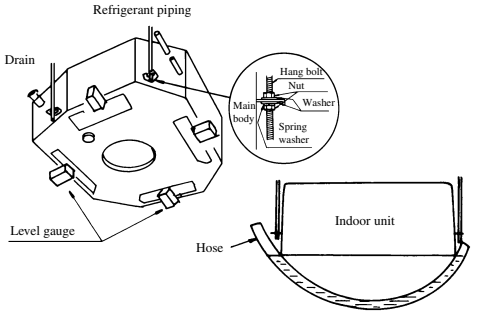
| Model | a | b |
|---|---|---|
| FDT258, 308 | 210 | 260 |
| FDT408, 508 | 270 | 320 |

### (3) Hanging

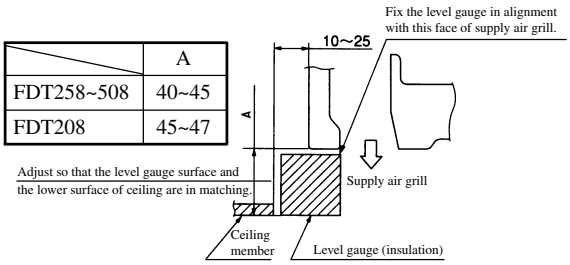
- Arrange four sets of a hang bolt (M10 or M8) , a nut for it, a plain washer and a spring washer on site.

**When there is the ceiling**

1. Make an 860 to 890 mm-square cutout on the ceiling.
   Refer to the outside dimensions of packing cardboard container.
   ▶ Align the center of ceiling cutout and the center of unit.
2. Decide the hang bolt position 675×780 in the case of 258 ~ 508, and 430×680 in the case of 208.
3. Use four hang bolts and fix them so that each bolt can resist the pull out load of 50kgf.
4. Decide the length of hang bolt to approx. 70mm above the ceiling surface.
5. After hanging in the unit, fix the attached level gauge and secure the height of unit.
6. Use a transparent hose filled with water to check the levelness of unit. (The maximum allowable height difference between both ends of unit is 3mm.)




| | A |
|---|---|
| FDT258~508 | 40~45 |
| FDT208 | 45~47 |


Fix the level gauge in alignment with this face of supply air grill.
10~25
A
Adjust so that the level gauge surface and the lower surface of ceiling are in matching.
Supply air grill
Ceiling member
Level gauge (insulation)

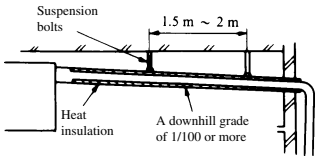
**Request**

- For the hang bolt whose length exceeds 1.3m, use the M10 size hang bolt and moreover combine a diagonal member to the hang bolt for reinforcement.

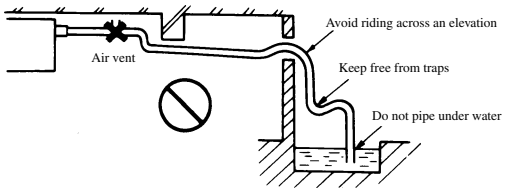
### (4) Drain Piping

(a) Drain piping should always be in a downhili grade (1/50~1/100) and avoid riding across and elevation or making traps.

**● Good piping**

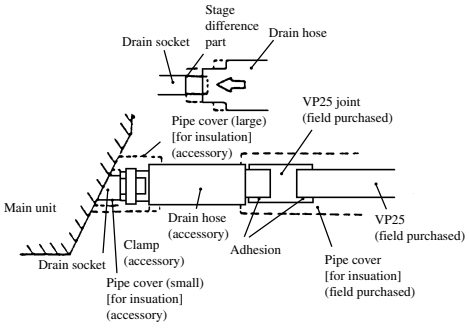



**● Improper piping**




(b) When connecting the drain pipe to unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

(c) For drain pipe, use hard PVC general purpose pipe VP-25 (I.D.1") which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).

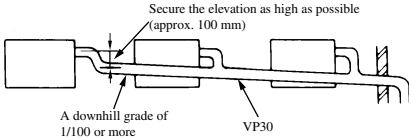


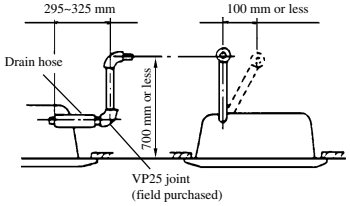

(d) When consturcting drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch. Use VP-30 (11/4") or thicker pipe for this purpose.

(e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

(f) Do not ever provide an air vent.

(g) The height of the drain head can be elevated up to a point 700 mm ablve the ceiling and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is higher than 500 mm, the back-flow quantity of drain at the event of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe within the distance given in the sketeh below.




(h) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

(i) The purpose of drain hose is to absorb minute discrepancy of the unit or the drain piping occurred when they are installed. Therefore, when it is bent intentionally or used under expanded condition, it may be damaged and result in water leakage.

**Drainage Test**

① Conduct a drainage test after completion of the electrical work.

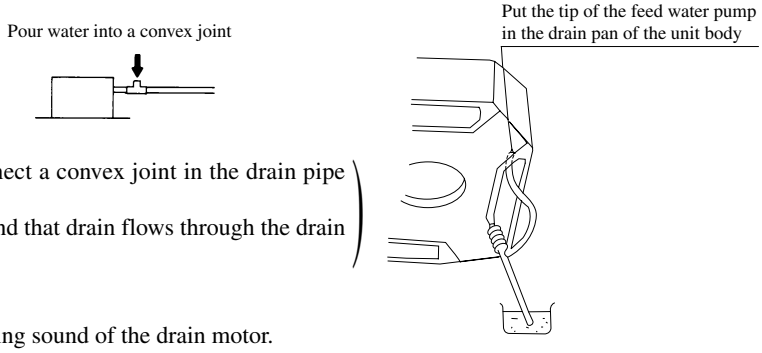
② During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.

③ In case of a new building, conduct the test before it is furnished with the ceiling.

④ Be sure to conduct this test even when the unit is installed in the heating season.

**Procedures**

① Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.




( If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet.
Then, check if water leaks from the piping system and that drain flows through the drain pipe normally. )

② Check at the exhaust port if drain is flowing.

(Note) Conduct this test paying attention to rotating sound of the drain motor.

③ Remove the drain plug located on the bottom of the drain pan when the water has to be evacuated from the unit.

④ After the test, fit the drain plug to the original place and turn off the power source.

**(5) Fixing of Decorative Panel (The panel fixing bolts are attached on the panel.)**

(a) Check with the accessory level gauges that the indoor unit height and the size of ceiling hole are correct.

- Remove the level gauges from the indoor unit before fixing the decorative panel.

(b) Screw two bolts out of four accessory bolts less than 5 mm in the indoor unit diagonally.

(c) Hang the panel on the two bolts and fix them temporarily.

(d) Tighten the bolts fixed temporarily and the ramaining two bolts.
Screw the remaining two bolts, and tighten all (four) bolts.

(e) Connect the louver motor connector (red) to the panel respectively.

(f) If the louver motor is not operated by remote control, check if the connector is connected correctly, and turn off the power for more then 10 seconds, then reset it.

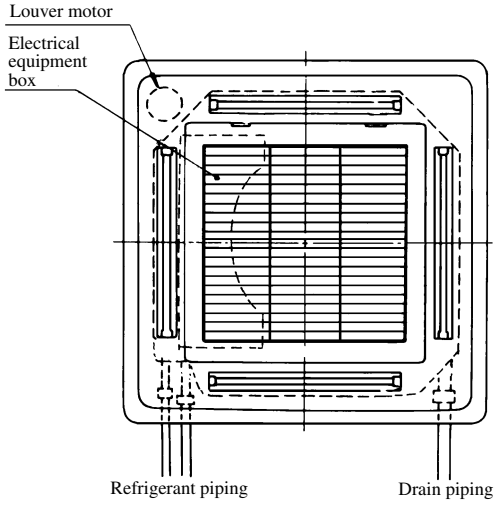
**Panel Joint Setting**

- The panel can turn 30 mm to the left and to the right in all, and the indoor unit turns 30 mm to the left and to the right in all in the case of 258~508, and 20 mm in the case of 208.

**Limit Fixing Panel**

① Fix the panel only in the direction shown in the figure.

② If it is fixed in other way, air will leak. Also, wires cannot be connected for auto swing and receiver amp.



**Cassetteria type (FDR)**

**(1) Preparation of indoor unit**

Before of during the installation of the unit, assemble necessary optional panel, etc. depending on the specific type.

**(2) Select places for installation satisfying following conditions and, at the same time, obtain the consent on the part of your client user.**

(a) Places where chilled or heated air circulates freely.

When the installation height exceeds 3m warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

(b) Places where perfect drainage can be prepared and sufficient drainage.

(c) Places free from air disturbances to the suction port and blowout hole of the indoor unit, places where the fire alarm may not malfunction or short-circuit.

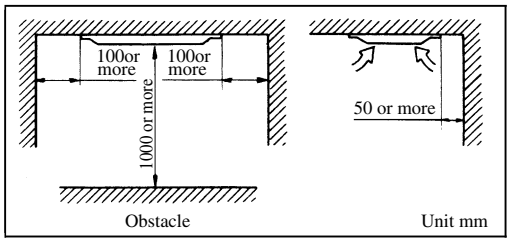
(d) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%.

(When installing at a place under a high humidity environment, pay sufficient attention the prevention of dewing such as thermal insnlation of the unit proper.)

(e) Ceiling height shall have the following height.

| Models / Panel | FDR208,258,308 | FDR408,508 |
|---|---|---|
| Combination with silent panel | 365mm | 416mm |
| Combination with canvas panel | 459mm | 510mm |

- Installation space.




**(3) Avoid installation and use at those places listed below.**

(a) Places exposed to oil splashes or steam (e.g. kitchens and machine plants.)

Installation and use at such places incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

(b) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc) in generated or remains.

Installation and use at such places cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

(c) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals.

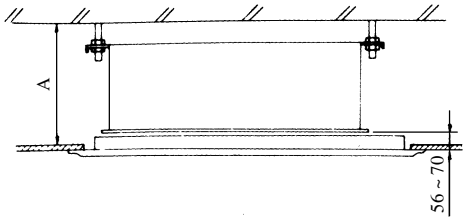
Generated noise may cause malfunctioning of the controller.

### (4) Preparation for suspending the unit

#### (a) Selection of hanging pattern

When the unit is hanged from ceiling, select one of following patterns depending on the dimensions of the ceiling.

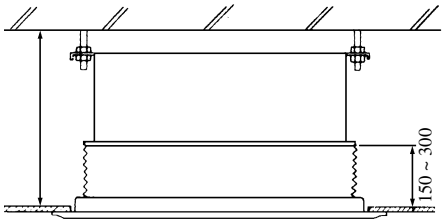
**< Combination with silent panel >**




Unit: mm

| Dimentions / Models | A |
|---|---|
| FDR208,258,308 | 365 or over |
| FDR408,508 | 416 or over |

**< Combination with canvas panel >**

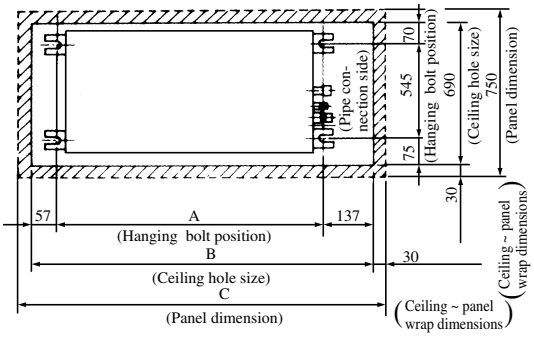



Unit: mm

| Dimentions / Models | A |
|---|---|
| FDR208,258,308 | 459 or over |
| FDR408,508 | 510 or over |

#### (b) Size of hole at ceiling and position of hanging bolts

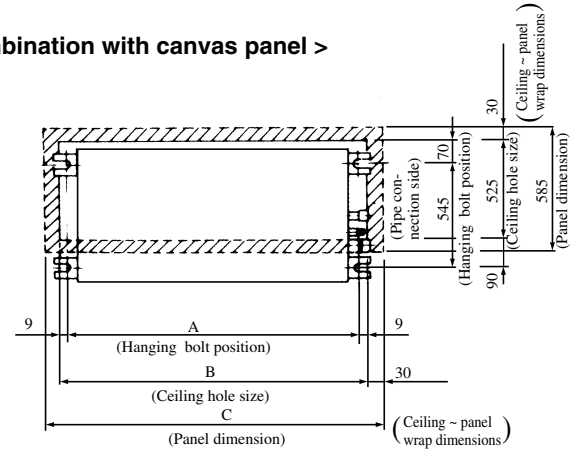
**< Combination with silent panel >**




Unit: mm

| Dimentions / Models | A | B | C |
|---|---|---|---|
| FDR208 | 786 | 980 | 1040 |
| FDR258,308 | 986 | 1180 | 1240 |
| FDR408,508 | 1406 | 1600 | 1660 |

**< Combination with canvas panel >**

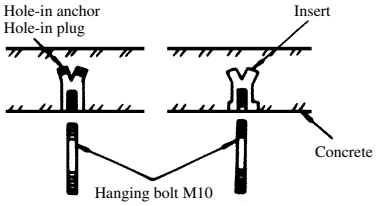



Unit: mm

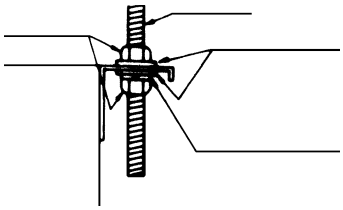
| Dimentions / Models | A | B | C |
|---|---|---|---|
| FDR208 | 786 | 804 | 864 |
| FDR258,308 | 986 | 1004 | 1064 |
| FDR408,508 | 1406 | 1424 | 1484 |

#### (c) Hanger bolts installation

- Use care of the piping direction when the unit is installed.



### (5) Installation of indoor unit



- Fix the indoor unit to the hanger bolts.

  If required, it is possible to suspend the unit to the beam, etc.

  Directly by use of the bolts without using the hanger bolts.

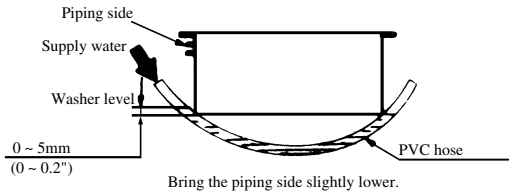
**Note**

When the dimensions of main unit and ceiling holes does not match, it can be adjusted with the slot holes of hanging bracket.

**Adjusting to the levelness**

(a) Adjust the out-of levelness using a level or by the following method.

- Make adjustment so that the relation between the lower surface of the unit proper and water level in the hose becomes as given below.




(b) Unless the adjustment to the levelness is made properly, malfunctioning or failure of the float switch may occur.

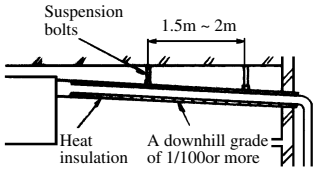
**Tap selection on blower unit** **(When the high performance filter is used.)**

**Taps of blower unit are set at the standard selection at the shipping from factory. Where the static pressure is raised by employing such option as the high performance filter, etc., change the connection of connectors provided at the flank of control box as shown below.**

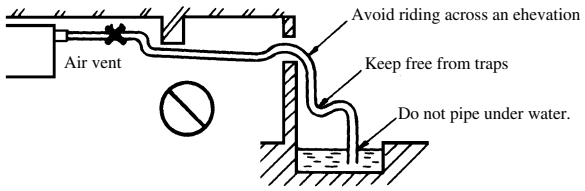
### (6) Drain Piping

(a) Drain piping should always be in a downhill grade (1/50~1/100) and avoid riding across an elevation or making traps.

**• Good piping**

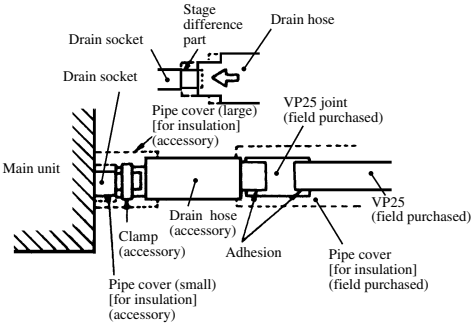



**• Improper piping**




(b) When connecting the drain pipe to unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

(c) For drain pipe, use hard PVC general purpose pipe VP-25(I.D.1″) which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).



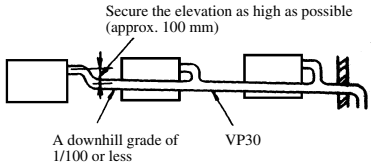
(d) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch. Use VP-30(11/4″) or thicker pipe for this purpose.

(e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

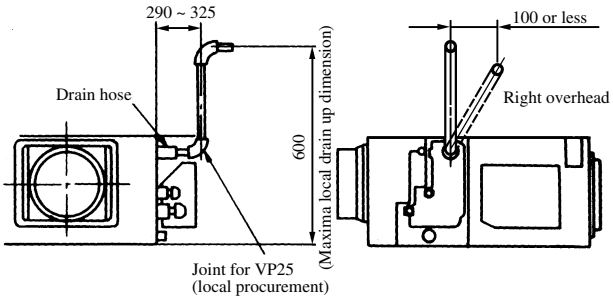
(f) Do not ever provide an air vent.

(g) The height of the drain head can be elevated up to a point 600mm from the bottom of unit, and when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is higher than 600mm, the back-flow quantity of drain at the event of interruption of the operation gets too mush and it may cause overflow at the at the drain pan. Therefore, make the height of the drain pipe within the distance given in the sketch below.

(h) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.




Unit: mm




**Drainage Test**

① Conduct a drainage test after completion of the electrical work.

② During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.

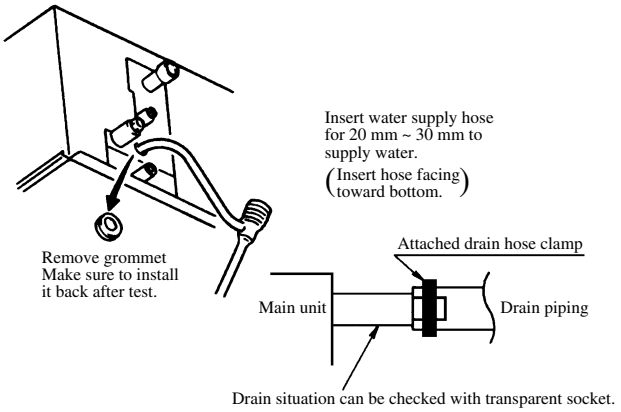
③ In case of a new building, conduct the test before it is furnished with the ceiling.

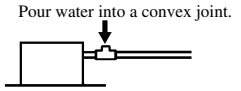
④ Be sure to conduct this test even when the unit is installed in the heating season.

**Procedures**

① Supply about 1000cc of water to the unit through the air outlet using a feed water pump.

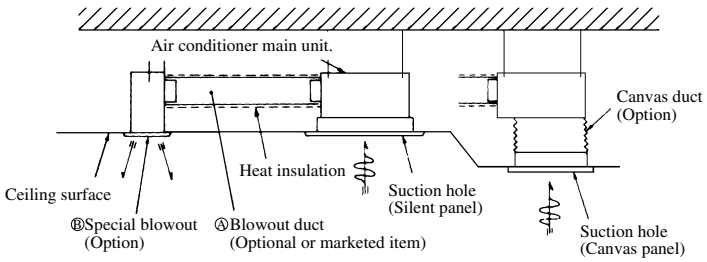
② Check the drain while cooling operation.




( In the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet.
Then, check if water leaks from the piping system and that drain flows through the drain pipe normally. )

### (7) Installation work for air outlet ducts




**Calculate the draft and external static pressure and select the length, shape and blowout.**

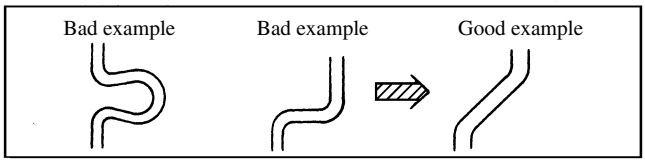
**Ⓐ Blowout duct**

- 2-spot, 3-spot and 4-spot with ϕ 200 type duct are the standard specifications. Determine the number of spots based on following table.

| FDR208 | FDR258,308 | FDR408,508 |
|---|---|---|
| 2-spot | 2~3-spot(1) | 3~4-spot(2) |

Notes (1) Shield the central blowout hole for 2-spot.
(2) Shield the blowout hole around the center for 3-spot.

- Limit the difference in length between spots at less than 2 : 1.
- Reduce the length of duct as much as possible.
- Reduce the number of bends as much as possible. (Corner R should be as larger as possible.)




- Use a band, etc. to connect the main unit and the blowout duct flange.
- Conduct the duct installation work before finishing the ceiling.

### (8) Connection of suction, exhaust ducts

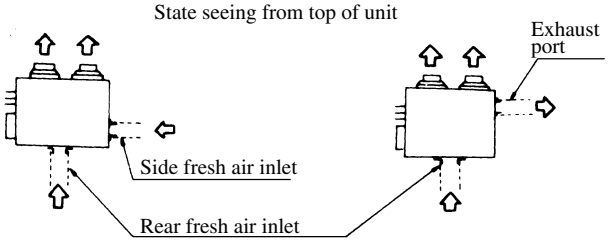



**Fig. 1** **Fig. 2**

#### (a) Duct connecting position

##### i) Fresh air inlet

- Inlet can be selected from the side or rear faces depending on the working conditions.
- Use the rear fresh air inlet when the simultaneous intake and exhaust is conducted. ( Side inlet cannot be used.)

##### ii) Exhaust (Make sure to use also the suction.)

Use the side exhaust port.

## (9) Installation of ornament panel

### <Case of silent panel>

| Name | Q'ty | Position |
|---|---|---|
| Round head set screw (M5 × 35) | 4 pcs. | Securing the panel |

### i) Accessory

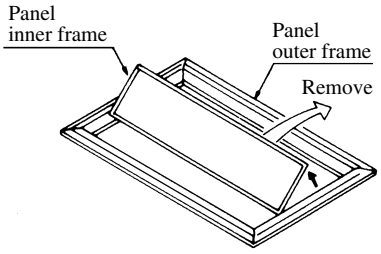
### ii) Installation procedures

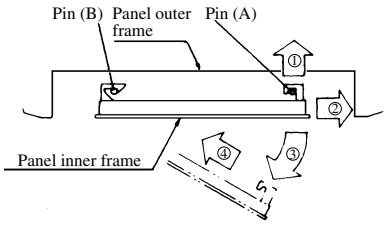
#### (a) Remove the inner frame of panel

- **How to remove the panel inner frame**

① Detach from pins (A) in the order of arrow ①→②.

② Open slightly as the arrow ③ and move toward the arrow ④ and detach from pin (B).




#### (b) Install the panel outer frame on the main unit.

- **Steps of installation**

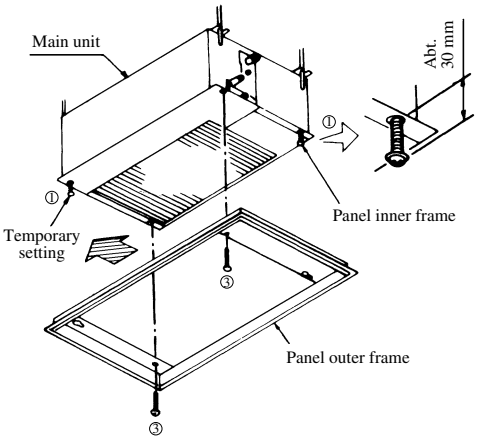
① Secure the panel tentatively with 2 of 4 panel set screws (panel accessory) as shown above.

② When the panel is supported with a pair of set screws, slide it in the arrow direction.

[Note: Panel outer frame has the orientation.]

③ Lock the former 2 and remaining 2 set screws.

④ Install the panel inner frame in the reverse order of removal.



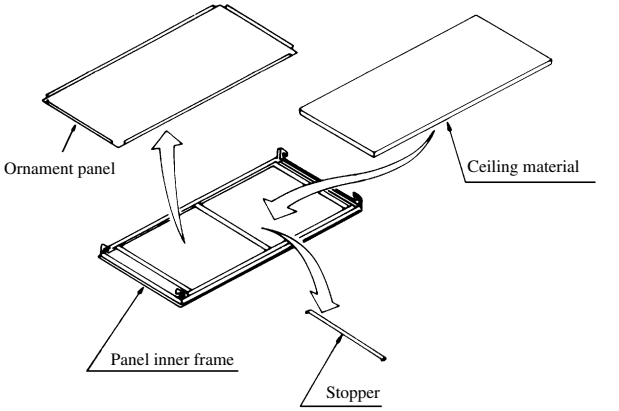

### <Case of canvas panel>

See installation manual which is equipped with canvas panel.

## Attachment of ceiling material

**Ceiling material can be attached to the panel inner frame.**

**(Plate thickness max. 15mm)**




## Attachment procedures

① Remove the stopper.

② Remove the ornament plate and attach the ceiling material.

③ Hold down the ceiling material and return the stopper in position.

Note (1) If the ceiling material is attached, the ornament plate is not used.

**Ceiling mounted duct type**

### (1) Selection of installation location

(a) Avoid installation and use at those places listed below.

1) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

2) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is gnerated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

3) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals. Generated noise may cause malfunctioning of the controller.

(b) Select places for installation satisfying the following conditions and, at the same time, obtain the consent on the part of your client user,.

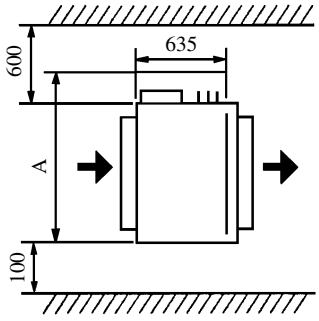
1) Places where chilled or heated air circulates freely. When the installation height exceeds 3m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

2) Places where perfect drainage can be prepared and sufficient drainage gradient is available.

3) Places free from air disturbances to the return air port and supply hole of the indoor unit, places where the fire alarm may not malfunction to short circuit.

4) Places with the environmental dew-point temperature is lower than 28˚C and the relative humidity is less than 80%.
( When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)

(c) Check if the selected place for installation is rigid enough to stand the weight of thew unit.
Otherwise, apply reinforcement using boards and beams before starting the installation work.

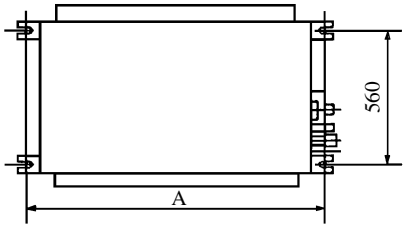



Unit : mm

| Models \ Mark | A |
|---|---|
| **FDUR208, 258, 308** | 1200 |
| **FDUR408, 508** | 1720 |

### (2) Suspension

Be sure to observe the finished length of the suspension bolts given below.

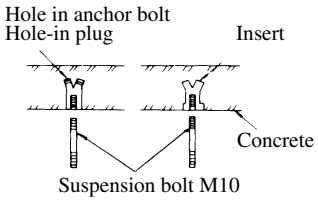


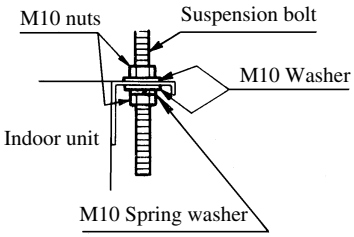

Unit : mm

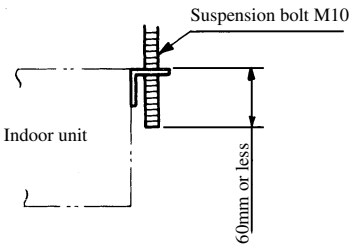
| Models \ Mark | A |
|---|---|
| **FDUR208, 258, 308** | 886 |
| **FDUR408, 508** | 1406 |

#### (a) Fixing the suspension bolt (customer ordered parts M10)

Securely fix the suspension bolt as illustrated below or in another way.



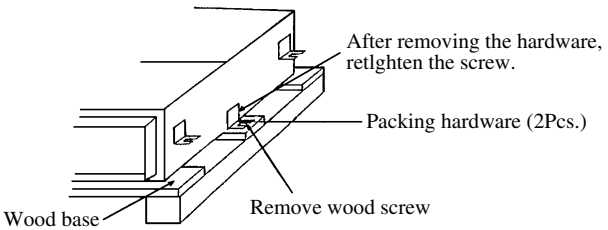




### (3) Installation of indoor unit

#### Packing hardware

Two pieces of packing handware are uesd.

Discard them after unpacking.




- Fix the indoor unit to the hanger bolts.
  If required, it is possible to suspend the unit to the beam,etc.
  Directly by use of the bolts without using the hanger bolts.

- When installing the unit, heed must be taken that the side touching the wood frame is the top surface of the unit.

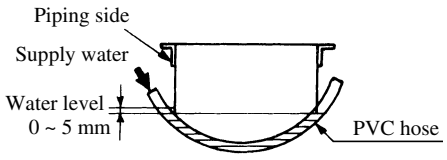
Note

When the dimensions of indoor unit and ceiling holes does not match, it can be adjusted with the slot holes of hanging bracket.

#### (a) Adjusting the unit's levelness

1) Adjust the out-levelness using a level vial or by the following method.

- Make adjustment so that the relation between the lower surface of the unit proper and water level in the hose becomes given below.




Bring the piping side slightly lower

2) Unless the levelness is adjusted properly, the malfunction of the float switch will occur.

**(b) Tap selection on blower unit.**

Taps of on blower unit are set at the standard selection at the shipping from factory. Where the static pressure is raised by changeing the connection of connectors provided at the flank of control box as shown below.

Unit : Pa

| Models \ Static Pressure | Standard tap | High tap |
|---|---|---|
| FDUR208,258 | 50 | 85 |
| FDUR308,408,508 | 50 | 130 |

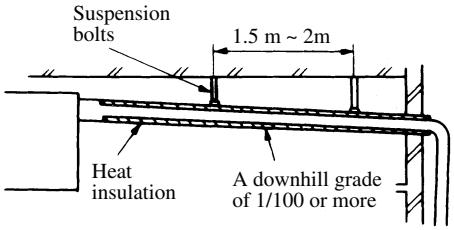
**⚠ CAUTION**

- Taps should not be used under static pressure outside the unit mentioned above. Dew condensation may occur with the unit and wet the ceiling or furniture.
- Do not use under static pressure outside the unit of 50Pa or less. Water drops may be blown from the diffuser outlet of the unit and wet the ceiling or furniture.

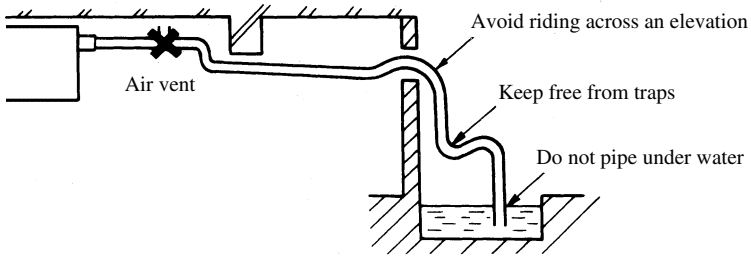
**(4) Drain piping**

(a) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or makeing traps.

- **Good piping**

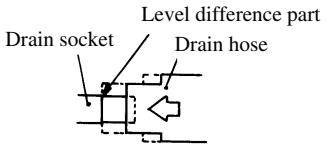


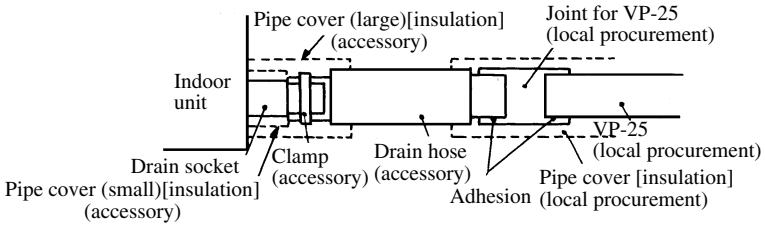

- **Improper piping**



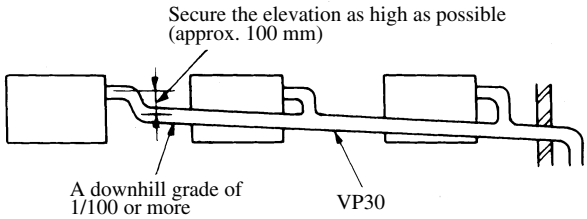

(b) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

(c) For drain pipe, use hard PVC general purpose pipe VP-25 which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose ( accessory).



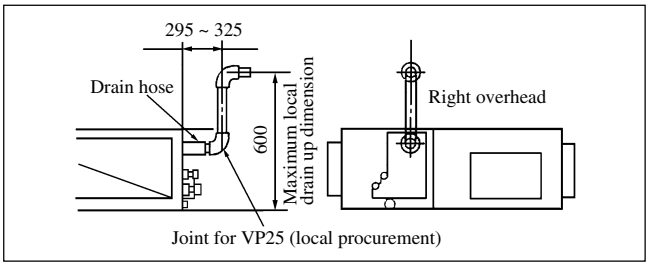

(d) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicher pipe for this purpose.




(e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

(f) Do not ever provide an air vent.

(g) The height of the drain head may be elevated up to a point 600 mm from the bottom of unit and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-flow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therfore, make the height of the drain pipe withing the distance given in the drawing below.



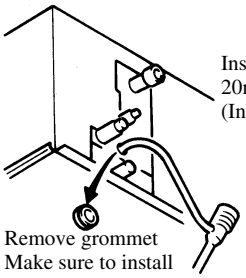

(h) Avoid positioning the drain piping outlet at a place where generation of odor may stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

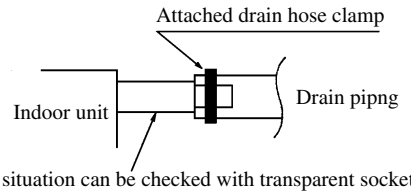
(i) Drainage test

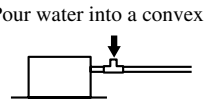
1) Conduct a drainage test after completion of the electrical work.
2) During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.
3) In case of a new building, conduct the test before it is furnished with the ceiling.
4) Be sure to conduct this test even when the unit is installed in the heating season.

Procedures

① Supply about 1000 cc of water to the unit through ghe air outlet by using a feed water pump.
② Check the drain while cooling operation.


Insert water supply hose for 20mm ~ 30mm to suply water. (Insert hose facing toward bottom.)
Remove grommet
Make sure to install it back after test.



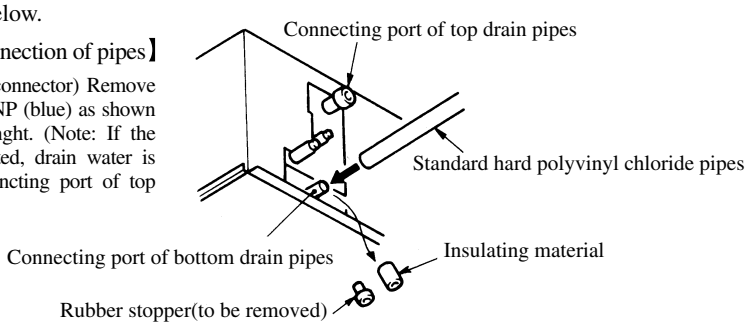

If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet.
Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.

(j) Outline of bottom drain piping work

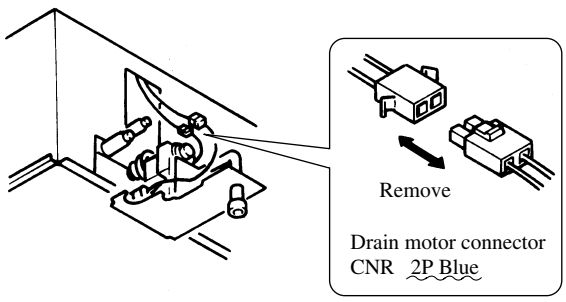
1) If the bottom drain piping can be done with a descending gradient (1/50-1/100), it is possible to connect the pipes as shown in the drawing below.

【Connection of pipes】

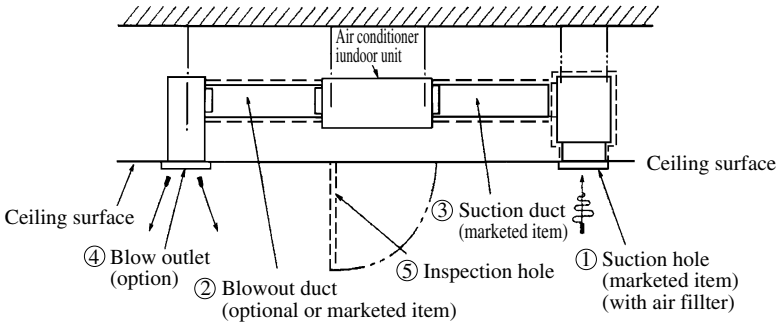
(Removing drain motor connector) Remove drain motor connector CNP (blue) as shown in the drawing on the nght. (Note: If the connector is left connected, drain water is discharged from the conncting port of top pipes, causing leakage.)

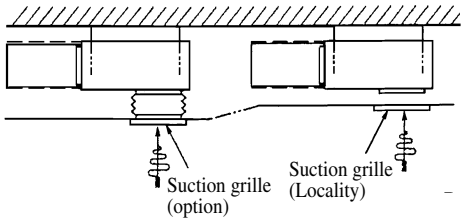

Connecting port of top drain pipes
Standard hard polyvinyl chloride pipes
Connecting port of bottom drain pipes
Insulating material
Rubber stopper(to be removed)

2) Do not use acetone-based adhesives to connect to the drain socket.



### (5) Duct work



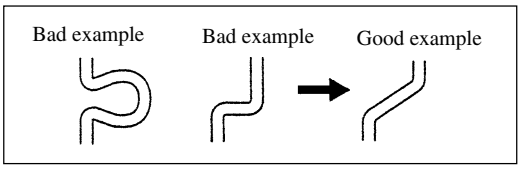




(a) A corrugated board (for preventing sputtering) is attached to the main body of the air conditioner (on the outlet port). Do not remove it until connecting the duct.

1) An air filter is provided on the main body of the air conditioner (on the inlet port). Remove it when connecting the duct on the inlet port.

(b) Blowout duct

1) Reduce the length of duct as much as possible.
2) Reduce the number of bends as much as possible.
3) (Corner R should be as larger as possible.)




4) Conduct the duct installation work before finishing the ceiling.

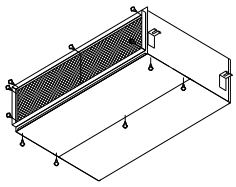
(c) Inlet port

1) When shipped, the inlet port lies on the back.
2) When connecting the duct to the inlet port, remove the air filter fitted to the inlet port.
3) When placing the inlet port to carry out suction from the bottom side, use the following procedure to replace the suction duct joint and the bottom plate.

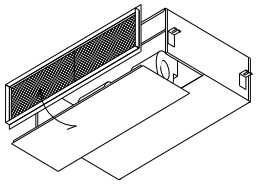
(d) Make sure to insulate the duct to prevent dewing on it.

(e) Location and form of blow outlet should be selected so that air from the outlet will be distributed all over the room, and equipped with a device to control air volume.

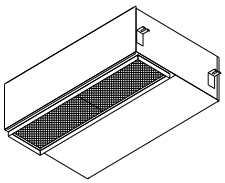
(f) Make sure provide an inspection hole on the ceiling. It is indispensable to service electric equipment, motor, functional components and cleaning of heat exchanger.



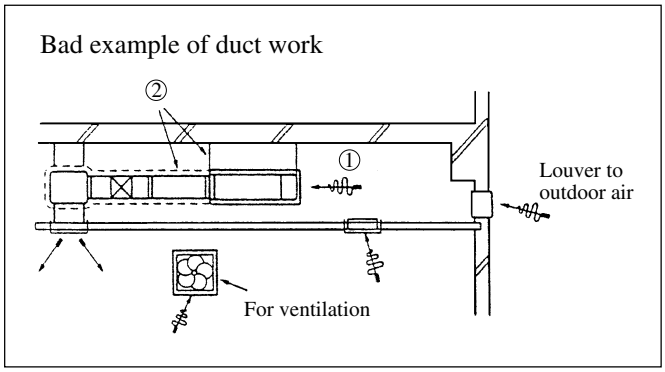
● Remove the screws which fasten the bottom plate and the duct joiht on the inlet port side of the unit.



● Replace the removed bottom plate and duct joint



● Fit the duct joint with a screw, fit the bottom plate.



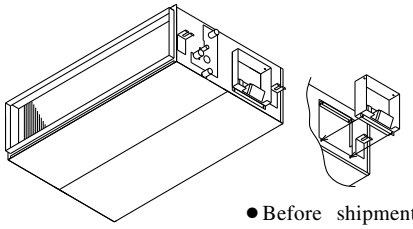
(g) If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the out door air louver, weather (rainy day) and others.

1) Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling.
   Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume.
   When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct.
   In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold the glass wool in place.)
2) It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35˚C DB, suction air temperature is 27˚C WB) and it could result in such troubles as compressor overload, etc..
3) There is a possibillty that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from be heat exchanger may fail to reach the drain pan but leak outside (e. g. drip on to the ceiling) with consequential water leakage in the room.

### (6) Control box (Only case of FDUR408-A, 508-A)

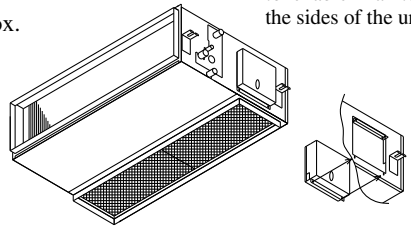
- During bottom side suction, the orientation of the control box can be changed to allow the control box to be maintained from the inlet port.

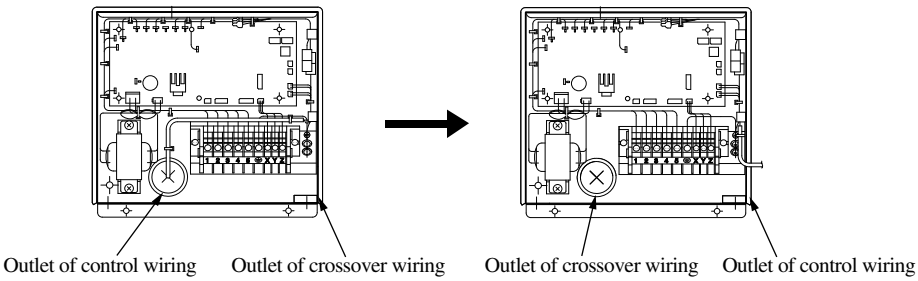
(a) Remove the bottom plate (on the inlet port side), and all wiring connectors from the control box.



- Before shipment from the plant, arrangements are made to enable maintenance from the sides of the unit.

(b) Remove the three screws that fasten the cabinet inside the control box.
(c) Pull the control box toward the outside of the unit.
(d) Change the ejection of the wiring inside the control box.
(e) Fit the control box from the inside of the unit.
(f) Fit the three screws that fasten the cabinet.
(g) Correctly connect all wiring connectors.





## 5.2 Installation of remote controller (Optional parts)

**(1) Selection of installation location**

**Following locations should be avoided:**

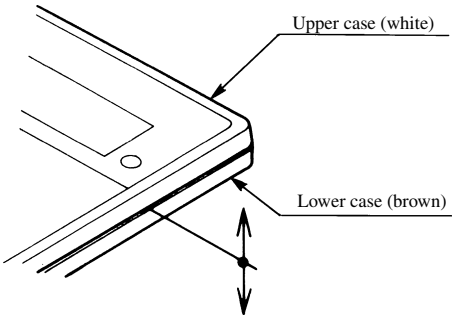
(a) Where exposed to direct sunlight
(b) Near the heat source
(c) Highly humid area or where splashed with water
(d) Uneven installation surface

**(2) Selection of installation location**

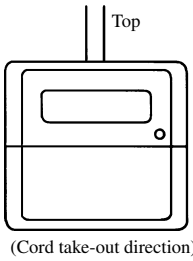
**(i) Exposed installation**

(a) Remove the remote controller case.

- Insert finger nails between the upper (white) and lower (brown) cases and ply them to open.

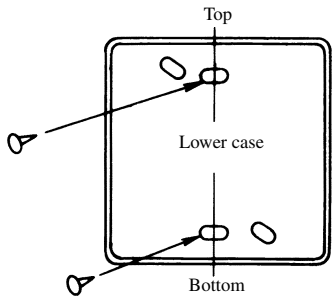



(b) Remote controller cords can be taken out upward only as shown below.




- Cut the remote controller lower case off at the top and thin section with a nipper, knife or other and remove burrs from the cut with a file or other.

(c) Secure the remote controller lower case on the wall with 2 pieces of wood-screws.

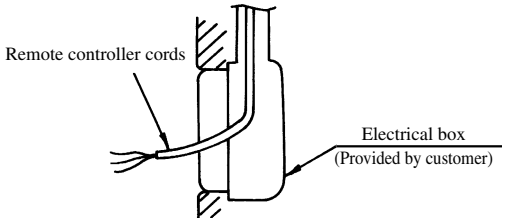



(d) Connect the remote controller cords with the terminal block. Make sure to align the terminal numbers on the indoor unit and the remote controller. Polarities are specified on the terminal block so that the unit will not be operated if the cords are connected improperly.
Terminals: (X) red wire, (Y) white wire, (Z) black wire

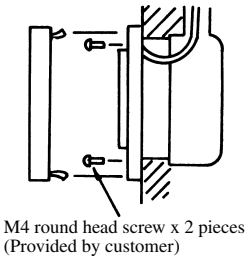
1) Set necessary functions in accordance with the model of indoor unit.
2) Couple the upper case with the lower case as they were.
3) Secure the remote controller cords on the wall or other using cord clamps.

**(ii) Exposed installation**

(a) Have a Electrical box and remote controller cords (use shielding wires or twisted pair wires for extension) embedded in the wall in advance.




(b) Remove the upper case from the remote controller.
(c) Secure the remote controller body on the Electrical box with 2 pieces of M4 round head screw (provided by customer).
(d) Connect remote controller cords with the remote controller. (Refer to the section regarding the exposed installation.)
(e) Couple the upper case with the lower case as it was to finish up the installation.




**Cautions for extension of remote controller cords**

- **Make sure to use shielding wires only.**
  - **All models: 0.3 mm² x 3 core wires [MVVS3C, products of Keihan Cables]**

Note (1) When the extension distance exceeds 100 m, change the wire size as follows:
100 ~ 200 m ... 0.50 mm² × 3 core wires
~ 300 m ... 0.75 mm² × 3 core wires
~ 400 m ... 1.25 mm² × 3 core wires
~ 600 m ... 2.00 mm² × 3 core wires

- **Make sure to ground one side only of the shielding wire.**

## 5.3 Installation of outdoor unit

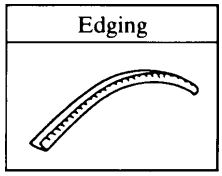
**⚠WARNING**

BE SURE TO READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE SERIOUS INJURY OR DEATH, EQUIPMENT MALFUNCTION AND/OR PROPERTY DAMAGE.

### (1) Installation

#### (a) Accessories

Confirm accessories shown below are attached in the bag with this installation manual.




1) "Edging" for protection of electric wires from opening edge.

#### (b) Selection of installation location

Select the installation location after obtaining the approval of customer.

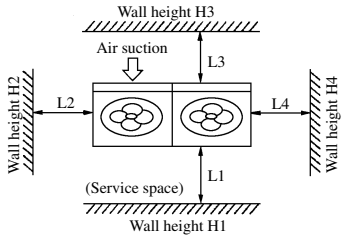
1) The place where the foundation can bear the weight of Outdoor unit.
2) The place where there is no concern about leakage of combustible gas.
3) The place where it is not stuffy.
4) The place where free from thermal radiation of other thermal source.
5) The place where flow of drain is allowed.
6) The place where noise and hot air blast do not trouble neighboring houses.
7) The place where there is no obstruction of wind at the intake air port and discharge air port.
8) When the unit is installed at the particular location as shown below, corrosion or failure may be caused. Please consult the dealer from which you purchased the air-conditioner.
   a) The place where corrosive gas is generated (hot spring, etc.).
   b) The place where wind containing salt blows (seaside area).
   c) The place where enveloped by oil mist.
   d) The place where there is a machine that radiates electromagnetic wave.

**Request**

- Restrict the height of obstruction wall in front of the discharge air port to the height of unit or less.
- Do not enclose around the unit by the obstruction. Secure the top space for 1 m or more.
- When installing the units side by side in series, secure a space of 10 mm between units.
- When installing the unit where there is a concern about the short circuit, attach the guide louver in front of discharge air port to prevent the short circuit.
- When installing plural units in a group, secure sufficient intake space to prevent the short circuit.
- When installing the unit where it is covered by snow, provide appropriate snow break means.
- When installing the unit where it is subject to strong wind, execute wind-breaking work.

#### (c) The minimum space for installation

Select the space considering the direction of refrigerant piping.




Unit: mm

| Dimensions \ Installation example | I | II | III |
|---|---|---|---|
| $L_1$ | Open | Open | 500 |
| $L_2$ | 0 | 0 | 0 |
| $L_3$ | 300 | 300 | 300 |
| $L_4$ | Open | 500 | 0 |
| $H_1$ | – | – | 1000 or less |
| $H_2$ | No limit | No limit | No limit |
| $H_3$ | No limit | No limit | 700 or less |
| $H_4$ | – | No limit | No limit |

Note (1)

If the wall heightH1 and H3 in installation example III exceed the limit, make L1 and L3 as follow.

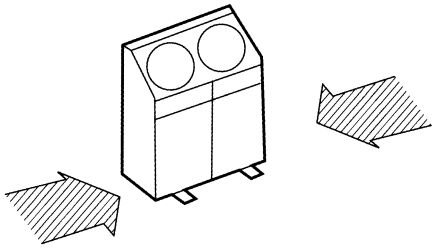
L1 = H1 - 500

L3 = 300 + ( H3 - 700 ) / 2

However, if L3 is larger than 600, there is no limit on wall height H3.

**(d) In the case where the unit is exposed to strong wind.**

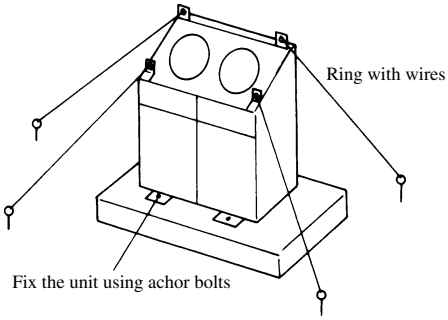
- Face the unit air outlet at a 90 ˚angle from the direction of the wind.



**(c) Securing outdoor unit (in the case of exposure to severe weather conditions)**

Fix the unit in the following way.

- Use overturning prevention brackets.
- Rig with wires.



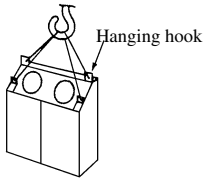

(Use rigging wires that are resistant to corrosion and sufficient in strengh.
For example SUS304-W1, wire thickness 2.9 mm)

**(2) Carry-in and installation of unit**

Pay sufficient attention to the carry-in and moving work of the unit, and always execute work by two persons or more.

**(a) Carry-in**

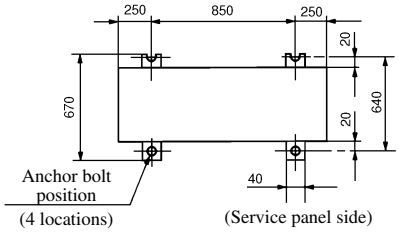
1) When carrying-in the unit, carry it in as packed condition to the installation site as near as possible.
2) If you are compelled to carry-in the unit unpacked condition, lift the unit by the rope using a nylon sling or applying protection plates so that the unit is not marred.



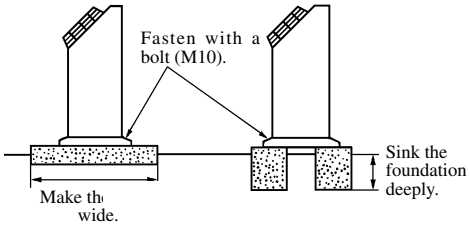

**⚠ CAUTION** • **Rope the unit taking the discrepancy of center of gravity into consideration.**

**(b) Bolt securing position**

Unit: mm




1) Use anchor bolts (M10) to secure the unit's legs.
2) Securely install the unit so that it dose not fall over during earthquakes or strong winds, etc.
3) Refer to the above illustrations for information regarding concrete foundations.
4) Install the unit in a level area. (With a gradient of 1/100 or less.)

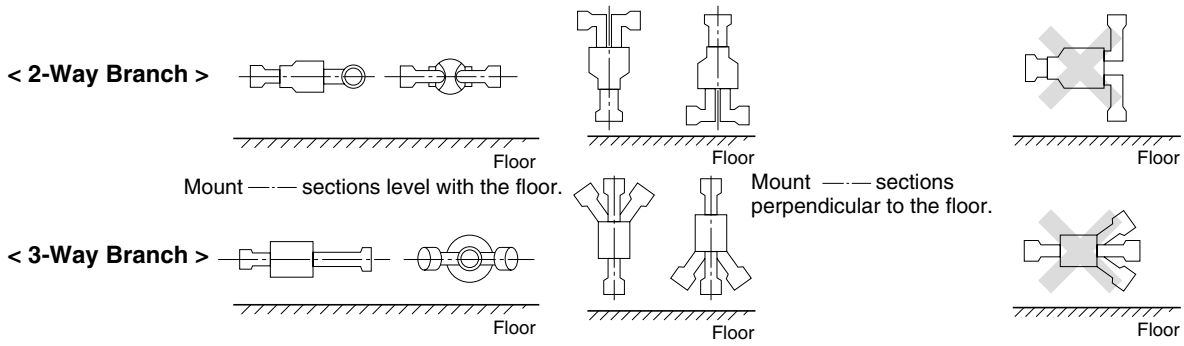


### (3) Refrigerant piping work

Select the piping specification to fit the specification of Indoor unit and installation location.

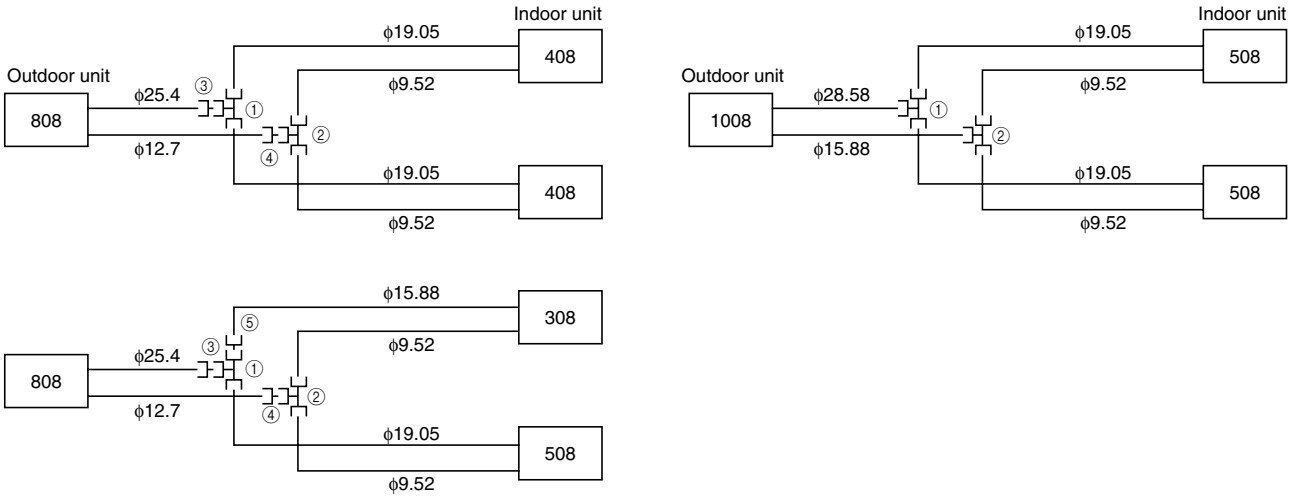
#### (a) Decision of piping specification

- **The branch piping (both gas and liquid lines) should always be arranged to have a level or perpendicular branch.**



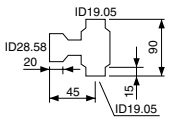
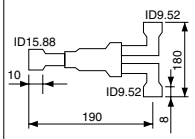
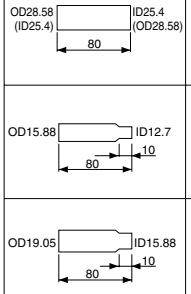

#### (i) Twin type

- **FDCP808HES3 [Branch pipe set: DIS-WB]**
- **FDCP1008HES3 [Branch pipe set: DIS-WB]**



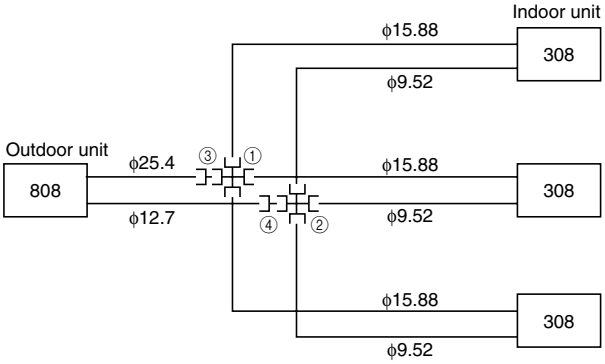

Notes (1) ① to ⑤ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch.

**Chart of shapes of branch piping parts (DIS-WB)**

| Gas pipe | Mark | Liquid pipe | Mark | Reducer | Mark |
|---|---|---|---|---|---|
|   | ① |   | ② |   | ③ ④ ⑤ |

### (ii) Triple type

- **FDCP808HES3 [Branch pipe set: DIS-TB]**




- **FDCP1008HES3 [Branch pipe set: DIS-TB]**

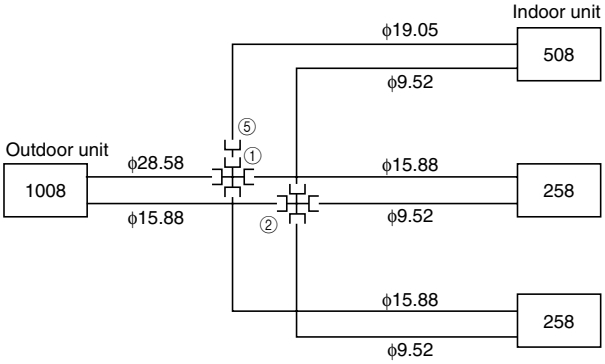
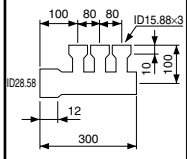
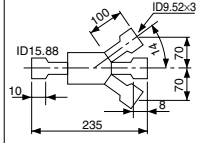
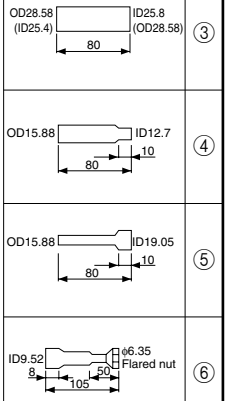



**Chart of shapes of branch piping parts (DIS-TB)**

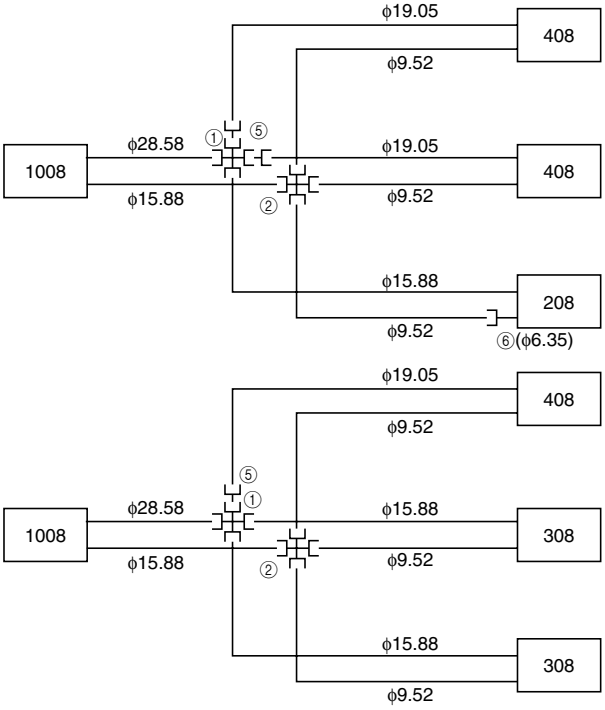
| Gas pipe | Mark | Liquid pipe | Mark | Reducer | Mark |
|---|---|---|---|---|---|
|  | ① |  | ② |  | ③ ④ ⑤ ⑥ |



Notes (1) ① to ⑥ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.

(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the 72 page for details.)

(3) If the indoor unit is the 208 type, always use a ø 9.52 size branch piping (branch piping to indoor unit) .







### (iii) Double twin

- **FDCP808HES3 [Branch pipe set: DIS-WA × 2set, DIS-WB × 1set]**

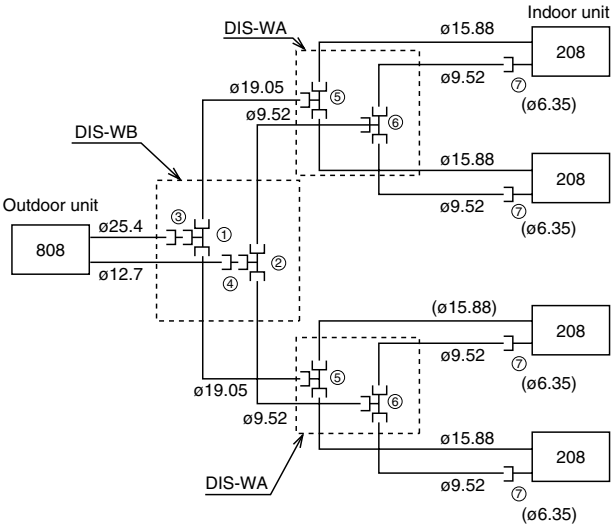
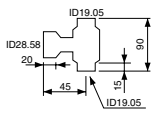
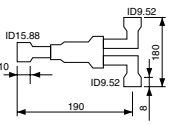
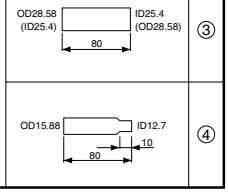


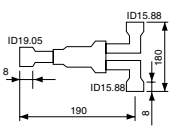
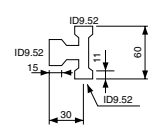
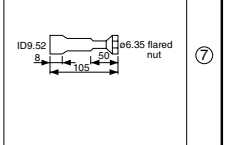

**Chart of shapes of branch piping parts**

- **DIS-WB**

| Gas pipe | Mark | Liquid pipe | Mark | Reducer | Mark |
|---|---|---|---|---|---|
|  | ① |  | ② |  | ③ ④ |



- **DIS-WB**

| Gas pipe | Mark | Liquid pipe | Mark | Reducer | Mark |
|---|---|---|---|---|---|
|  | ⑤ |  | ⑥ |  | ⑦ |



Notes (1) ① to ⑦ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.

(2) Branch piping should always be arranged to have level or perpendicular branch.(Refer to the 72 page for details.)

(3) If the indoor unit is the 208 type, always ues a ø 9.52 size branch piping (branch piping to indoor unit).

- **FDCP1008HES3 [Branch pipe set: DIS-WA × 2set, DIS-WB × 1set]**

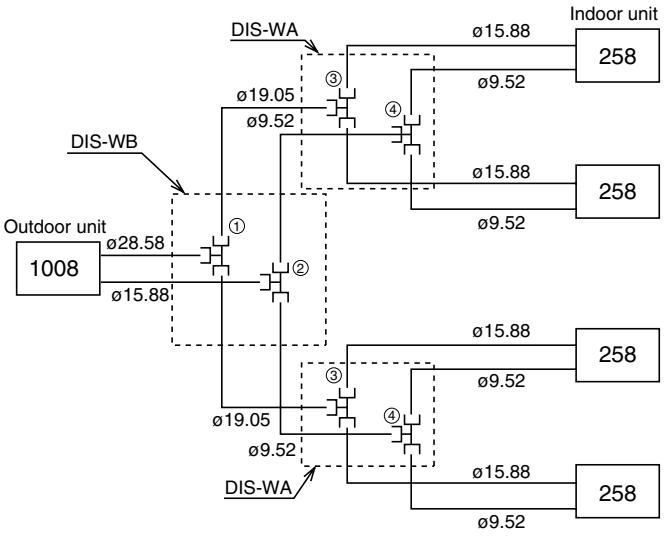
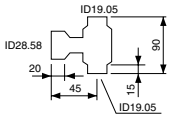
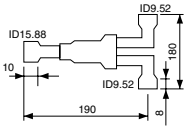


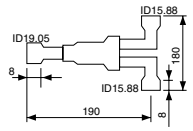
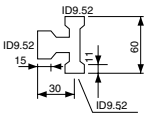

**Chart of shapes of branch piping parts**

● **DIS-WB**

| Gas pipe | Mark | Liquid pipe | Mark |
|---|---|---|---|
|  | ① |  | ② |



● **DIS-WA**

| Gas pipe | Mark | Liquid pipe | Mark |
|---|---|---|---|
|  | ③ |  | ④ |

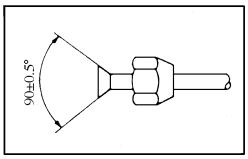


Notes (1) ①to④in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the 72 page for details.)

### (b) Piping work

**Request**

- Use the pipe made of following material. Moreover, it is very convenient for you to use the separately sold piping kit. Material: Phosphor deoxidized seamless copper tube (C1220T, JIS H3300)
- In the case of this unit, condensation water is also generated on the liquid piping. Insulate both of the liquid piping and gas piping perfectly.
- In the case of heat pump type unit, the maximum temperature of the gas piping reaches approx. 120˚C, therefore use the insulation material which has sufficient heat resistance.
- When bending the pipe, bend it with large radius as much as possible. Do not bend the same portion of pipe repeatedly.
- Do not let dust, chips or water enter the pipe while pipe working.
- The flared connection for refrigerant piping is required. Flare the pipe after inserting the flared nut into the pipe.
- Tighten the flared connection firmly using 2 of spanners. Comply with the following value for tightening torque of the flared nut.

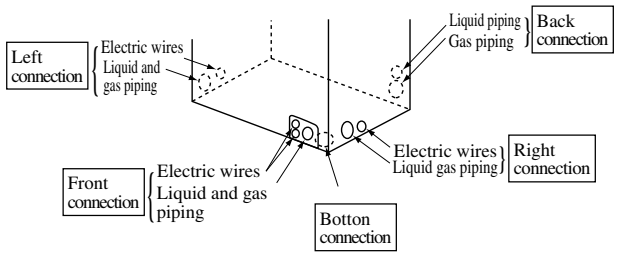



ø 6.35: 16 to 20 (N·m) ø 9.52, ø 12.7: 40 to 50 (N·m) ø 15.88: 90 to 120 (N·m) ø 19.05: 100 to 140 (N·m)

- In the case of brazing connection, perform brazing while flowing nitrogen gas in the pipe to prevent generation of oxide film inside the pipe without fail.

#### 1) Refrigerant pipe connection

a) The piping can be taken out to the right, left front, rear and botton directions.
b) Cut the plate at the knockout portion on the piping penetration section with necessary minimum size.
c) Mount the attached edging by cutting it to the appropriate length before connecting the pipe.




**⚠ IMPORTANT**

- **Take care so that the piping to be worked does not contact the parts contained in the unit. If it contacts the inner parts, abnormal sound or vibration may occur.**

### (c) Leak test and air purge

Perform the procedure according to the following instructions.

**Request** ● Perform the air purge of Indoor unit and refrigerant piping by vacuuming method without fail.

**Leak test**

(1) The unit's air-tightness test has been conducted but after completing the piping connections conduct an air-tightness test of the connected piping and the indoor units using the outdoor gas side service valve check joint. Be sure to conduct this test with the service valve closed.

① When the pressure has been increased to 0.5 MPa stop increasing the pressure and maintain this state for at least 5 min. to check if the pressure drops.

② Next, increase the pressure to 1.5 MPa and again maintain this state for at least 5 min. to check if the pressure drops.

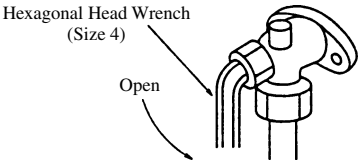
③ Then increase the pressure to 3.3 MPa and maintain this state for approx. one day to check if the pressure drops.

Use nitrogen gas for the air-tightness check.

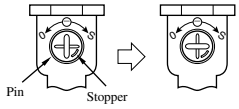
**Air purge**

(2) Extract air from the service valve charge port with the outdoor unit service valves (both liquid and gas sides) shut until the pressure drops to -101 kPa (-755mmHg) or lower, and con-tinue to extract air for at least one hour thereafter.

(3) After completion of vacuuming, remove the cap nut for the valve stem and fully open the service valve (for both of liquid and gas) as shown in the right illustration.
After confirming that the valve is fully open, tighten the cap nuts (for valve stem and charge port).




**Liquid service valve**




**gas service valve**

### (d) Charging with additional refrigerant

The length of piping will require charging with additional refrigerant. Refer to the table below for making the additional charge.

**If your calculations show that the additional charge amount is a minus number, charging is not required.**

| Item \ Amount | | FDCP808 | FDCP1008 |
|---|---|---|---|
| A Piping length already charged with refrigerant. | (m) | 5 | 5 |
| B Standard refrigerant volume. (When piping is 0 meters.) | (kg) | 4.73 | 6.75 |
| C Additional charge volume per 1 meter of main piping. | (kg/m) | 0.045 | 0.07 |
| D Amount of charge at time of shipping | (kg) | 4.95 | 7.10 |

Note (1) Use the table above to find the amount of additional charge (kg/m) C per 1 meter of piping.

● **f = Additional charge amount per 1 meter of branch piping**
**208, 258, 308: 0.025kg/m**
**408, 508: 0.035kg/m**

#### Method of Calculation

Refer to the example of calculation on the next page for the piping length code in the formula (L, $\ell_1$, ~ $\ell_3$).

**For additional charging** G = Amount of additional charge (kg.)

**Twin and triple specifications**

$G$ = main piping L (m) × C + branch piping length $\ell_1$ (m) × f + branch piping length $\ell_2$ (m) × f + branch piping $\ell_3$ (m) × f – (D – B)

(only for triple specifications)

**Double twin specification**

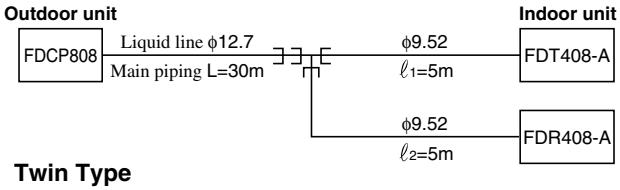
$G$ = main piping L (m) × C + branch piping $L_1$(m) × f + branch piping $L_2$ (m) × f + branch piping $\ell_1$ (m) × f + branch piping $\ell_2$ (m) × f + branch piping $\ell_3$ (m) × f + branch piping $\ell_4$ (m) × f - (D - B)

**[Example of Calculation]**

**1) For twin type**

**Outdoor Unit: FDCP808HES3**

**Indoor Unit: FDT408-A + FDR408-A**



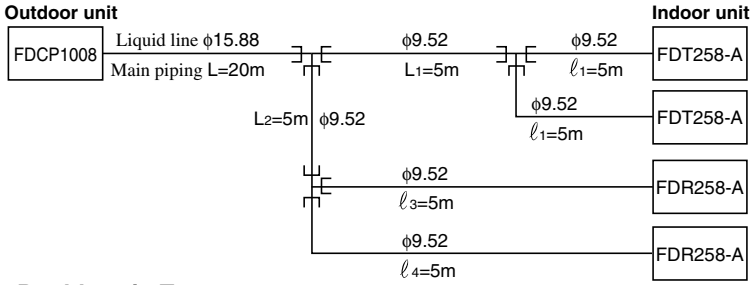

**Twin Type**

G=30m(L) × 0.045kg/m + 5m($\ell_1$) × 0.035kg/m + 5m($\ell_2$) × 0.035kg/m - (4.95 - 4.73)
=1.48kg **Amount of additional charge: 1.48 kg**

**2) For double twin type**

**Outdoor Unit: FDCP1008HES3**

**Indoor Unit: FDT258-A + FDT258-A + FDR258-A + FDR258-A**




**Double twin Type**

G=20m(L) × 0.07kg/m + 10m($L_1$+$L_2$) × 0.025kg/m + 20($\ell_1$ + $\ell_2$ + $\ell_3$ + $\ell_4$) × 0.025kg/m
- (7.1 - 6.75)=1.8kg **Amount of additional charge: 1.8 kg**

**For recharging** If vacuum extracted and recharging.

**Twin & triple specifications**

G = B + main piping L (m) × C + branch piping $\ell_1$ × f + branch piping $\ell_2$ (m) × f + branch piping $\ell_3$ (m) × f
(only fortriple specifications)

**Double twin specification**

G = main piping L (m) × C + branch piping $L_1$(m) × f + branch piping $L_2$ (m) × f + branch piping $\ell_1$ (m) × f
+ branch piping $\ell_2$ (m) × f + branch piping $\ell_3$ (m) × f + branch piping $\ell_4$ (m) × f

### (4) Electrical wiring

○ This air conditioning system should be notificated to supply authority before connection to power supply system.

(a) Selection of size of power supply and interconnecting wires.

**⚠ IMPORTANT**

- **Electric wiring work should be conducted only by authorized personnel.**
- **Use copper conductor only.**
- **Power source wires and Interconnecting wires shall not be lighter than polychloroprene sheathed flexible cord (design HO5RN-F IEC 57).**
- **Do not connect more than three wires to the terminal block.**
- **Use round type crimped terminal lugs with insulated grip on the end of the wires.**

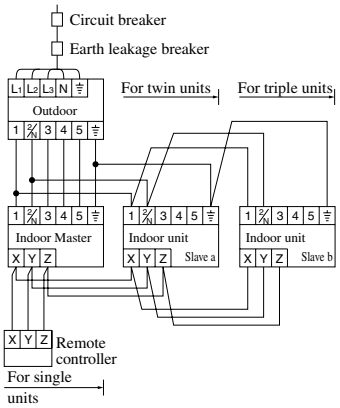
- Select wire sizes and circuit protection from Table 2.

Table 2 ( This table shows 20m length wires with less than 2% voltage drop. )

| Item / Model | Phase | Circuit breaker | | Power source wires (minimum) | Interconnecting and grounding wires (minimum) |
|---|---|---|---|---|---|
| | | Switch breaker (A) | Over-current protector rated capacity (A) | | |
| FDCP808HES3 | 3 | 50 | 50 | 5.5mm² | 2.0mm |
| FDCP1008HES3 | | | | 8.0mm² | |

(b) Wiring connection.

- Connect the same terminal number between the Indoor unit and Outdoor unit as shown in the following diagram.
- Make wiring to supply to the Outdoor unit, so that the power for the Indoor unit is supplied by ① and ② terminals.
- Secure the wiring with wiring clamp so that no external force is transmitted to the connecting portion of terminal.
- There is a ground (Earth) terminal in the control box.




1) Between the indoor Master and Slave units connect to the same No. as for terminal blocks ①②③ and Ⓧ Ⓨ Ⓩ.
2) Use rotary SW2 on the indoor circuit board to set the same remote controller communi-cation address for both the indoor Master and Slave units.
3) Set the indoor Slave units to Slave a to Slave c using the plural address switches SW2-3, and SW2-4 on the indoor circuit board.
4) After turning on the power, press the remote controller's "Air-conditioner No./Check" switch and then confirm that the connected indoor Master and Slave units are displayed on the remote controller.

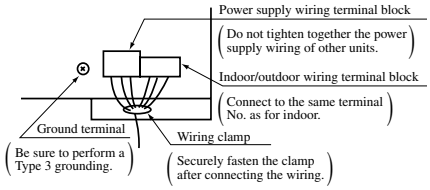
(c) Plural Master / Slave setting

Set the plural address switches SW2-3 and SW2-4 on the indoor circuit board as shown in the table below.

| Master setting at time of factory shipment | | Indoor unit | | | |
|---|---|---|---|---|---|
| | | Master | Slave a | Slave b | Slave c |
| Plural address switch | SW2-3 | OFF | OFF | ON | ON |
| | SW2-4 | OFF | ON | OFF | ON |

(d) Wiring out take direction

- The four directions of front, left, right, and bottom are possible.


Power supply wiring terminal block
(Do not tighten together the power supply wiring of other units.)
Indoor/outdoor wiring terminal block
(Connect to the same terminal No. as for indoor.)
Ground terminal
(Be sure to perform a Type 3 grounding.)
Wiring clamp
(Securely fasten the clamp after connecting the wiring.)

- When connecting piping on site, remove the outside panel's knock out plate. After removing the knock out plate, install the included edging around the edge of the hole in the panel.

**(5) Test run**

**⚠ CAUTION**

**THIS UNIT WILL BE STARTED INSTANTLY WITHOUT "ON" OPERATION WHEN ELECTRIC POWER IS SUPPLIED.**

**BE SURE TO EXECUTE "OFF" OPERATION BEFORE ELECTRIC POWER IS DISCONNECTED FOR SERVICING.**

- This unit has a function of automatic restart system after recovering power stoppage.

**DO NOT LEAVE OUTDOOR UNIT WITH THE SERVICE PANEL OPENED.**

- When the service panel is removed, high voltage portion and high temperature areas are exposed.

**⚠ IMPORTANT**

- **Check that the service valves are fully opened without fail before operation.**
- **Turn on the power for over 12 hours to energize the crankcase heater in advance of operation.**
- **Wait more than 3 minutes to restart the unit after stop.**

- Run the unit continuously for about 30 minutes, and check the following.
  - ○ Suction pressure at check joint on the compressor suction pipe.
  - ○ Discharge pressure at check joint on the compressor discharge pipe .
  - ○ Temperature difference between return air and supply air for Indoor unit.
- Refer to “Check Indicator Table” on wiring diagram of Outdoor unit or “User’s manual” of Indoor unit for diagnosis of operation failure.

# 6 MAINTENANCE DATA

## 6.1 Servicing

### (1) Evacuation

The evacuation is a procedure to purge impurities, such as noncondensable gas, air, moisture from the refrigerant equipment by using a vacuum pump. Since the refrigerant R407C is very insoluble in water, even a small amount of moisture left in the refrigerant equipment will freeze, causing what is called ice clogging.

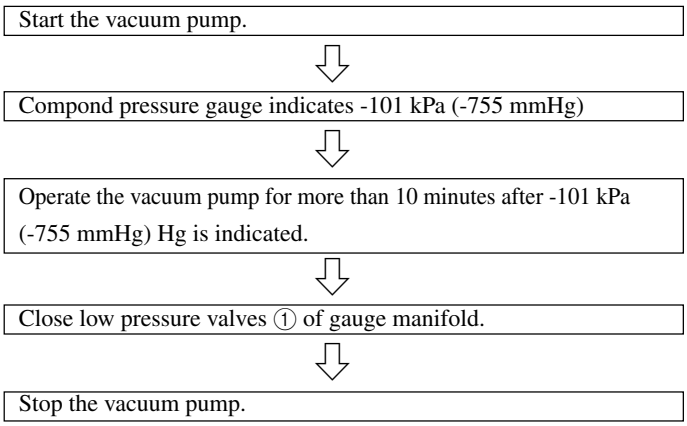
#### Evacuation procedure

Make sure that the both service valves of gas and liquid line are fully opened.

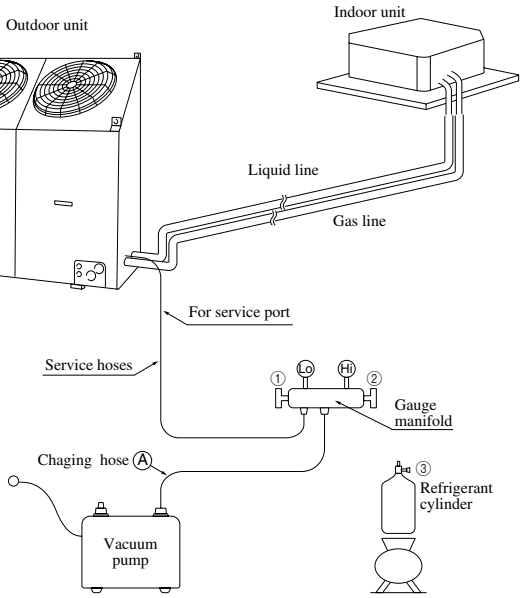
(a) Check to ensure that there is no internal pressure in the unit. If there is an internal pressure, it should be relived through the service port.

(b) Connect the charging hose of the gauge manifold to the service port of the gas piping.
Close high pressure valve ② of gange manifold.

(c) Connect the charging hose Ⓐ to a vecuum pump.
Repeat evacuation in the following sequence.


Start the vacuum pump.
Compond pressure gauge indicates -101 kPa (-755 mmHg)
Operate the vacuum pump for more than 10 minutes after -101 kPa (-755 mmHg) Hg is indicated.
Close low pressure valves ① of gauge manifold.
Stop the vacuum pump.

Notes (1) Do not use the refrigerant pressure to expel air.
(2) Do not use the compressor for evacuation.
(3) Do not operate the compressor in a vacuum condition.




Notes (1) Refer to the exterior-view drawing for the position of the service valve.
(2) When connecting of the service valve, flare connection for both the indoor and outdoor unit.

### (2) Refrigerant charging

(a) After the evacuation shown in the above, change the connection of the charge hose Ⓐ to the refrigerant cylinder.

(b) Purge air from the charge hose Ⓐ .

First loosen the connecting portion of the charge hose at the gauge manifold side and open valve ③ for a few seconds, and then immediately retighten it after observing that gas has blown out from loosened connecting portion.

(c) Open valves ① and ③ then gas refrigerant begins flowing from the cylinder into the unit.

When refrigerant has been charged into the unit to some extent, refrigerant flow becomes stagnant. When that happens, start the compressor in cooling cycle until the system is filled with the specified amount of gas, then close valves ① and ③ and remove the gauge manifold. Cover the service port with caps and tighten them securely.

(d) Check for gas leakage by applying a gas leak detector around the piping connection.

(e) Start the air conditioner and make sure of its operating condition.

## 6.2 Trouble shooting for refrigerant circuit

### (1) Judgement of operating condition by operation pressure and temperature difference

Making an accurate judgement requires a skill that is acquired only after years of experience, one trouble may lead to an another trouble from a single trouble source and several other troubles may exist at the same time which comes from a undetected different trouble source.

Filtering out the trouble sources can be done easier by comparing with daily operating conditions. Some good guides are to judge the operating pressure and the temperature difference between suction air and delivery air.

Following are some pointers,

| Pressure | | | | | | Trouble cause |
|---|---|---|---|---|---|---|
| Indi-cation / Cir-cuit | Too low | A little low | Normal | A little high | Too high | |
| High side | | | | | ● | 1) Excessive overcharging of refrigerant |
| Low side | | | | | ● | 2) Mixture of non condensable gas (air etc.) |
| High side | ● | | | | | Ineffective compression |
| Low side | | | | | ● | (defective compressor) |
| High side | | ● | | | | 1) Insufficient refrigerant in circuit |
| Low side | ● | | | | | 2) Clogging of strainer<br>3) Gas leakage<br>4) Clogging of air filter (in cooling)<br>5) Decrease in heat load (in cooling)<br>6) Locking of indoor fan (in cooling) |
| High side | | | | | ● | 1) Locking of outdoor unit fan (in cooling) |
| Low side | | | | ● | | 2) Dirty outdoor heat exchanger (in cooling)<br>3) Mixture of non condensable gas (air etc.) |
| High side | | | | ● | | 1) Too high temperature of room |
| Low side | | | | | ● | |

## 6.3 Diagnosing of microcomputer circuit

### (1) Selfdiagnosis function

#### (a) Indoor unit side

**Table of inspection items based on error codes**

| Error Code | Failure at: | Contents of the failure |
|---|---|---|
| E1 | Control switch wire (signal noise) | • Defective connection or broken wire for control switch signal wire.<br>• Signal noise has entered the control switch wire. |
| | Circuit board for control switch or indoor unit | • Is the circuit board for the control switch or the circuit board for the indoor unit is defective (communication circuit defective)? |
| E6 | Indoor unit heat exchanger thermistor | • Indoor unit heat exchanger thermistor defective (element defective or broken wire). Defective connection of connector for thermistor. |
| | Indoor unit circuit board | • Indoor unit circuit board defective (defective thermistor input circuit)? |
| E7 | Indoor unit air inlet thermistor | • Indoor unit return thermistor defective (element defective or broken wire). Defective connection of connector for thermistor. |
| | Indoor unit circuit board | • Indoor unit circuit board defective (defective thermistor input circuit)? |
| E8 | Installation and operating conditions | • Heating overload (temperature of heat exchanger for indoor unit abnormally high) |
| | Indoor unit heat exchanger thermistor | • Indoor unit heat exchanger thermistor defective (short circuit). |
| | Indoor unit circuit board | • Indoor unit circuit board defective (defective thermistor input circuit)? |
| E9 | Failure in drainage | • Failure with the condensate pump (DM), or open circuit or disconnection of connector with the condensate pump. |
| | Float switch | • Malfunctioning of the float switch (erroneous functioning) |
| | Indoor circuit board | • Indoor unit circuit board defective (defective float switch input circuit)<br>• Indoor unit circuit board defective (defective DM driving output circuit) |
| E10 | Number of indoor units connected | • 1 Remote controller for multiple unit control, 17 or more indoor units connected |
| E57 | Insufficient refrigerant | • Gas leak. |
| | Indoor unit heat exchanger thermistor | • Indoor unit heat exchanger thermistor defective (short circuit). |
| | Indoor unit circuit board | • Indoor unit circuit board defective (defective thermistor input circuit)? |

### (2) Error diagnosis procedures at the indoor unit side

To diagnose the error, measure the voltage (AC, DC), resistance, etc. at each connector around the circuit board of indoor unit based on the inspection display or the operation state of unit (no operation of compressor or blower, no switching of 4-way valve, etc.). If any defective parts are discovered, replace with the assembly of parts as shown below.

**(a) Single-unit replacement parts for circuit board of indoor unit.** (Peripheral electric parts for circuit board.)

**Indoor unit printed circuit board, thermistor (return, heat exchanger), operating switches, limit switches, transformers, fuses.**

Note (1) Use normal inspection methods to determine the condition of strong electrical circuits and frozen cycle parts.

**(b) Replacement procedure of indoor unit microcomputer printed circuit board**

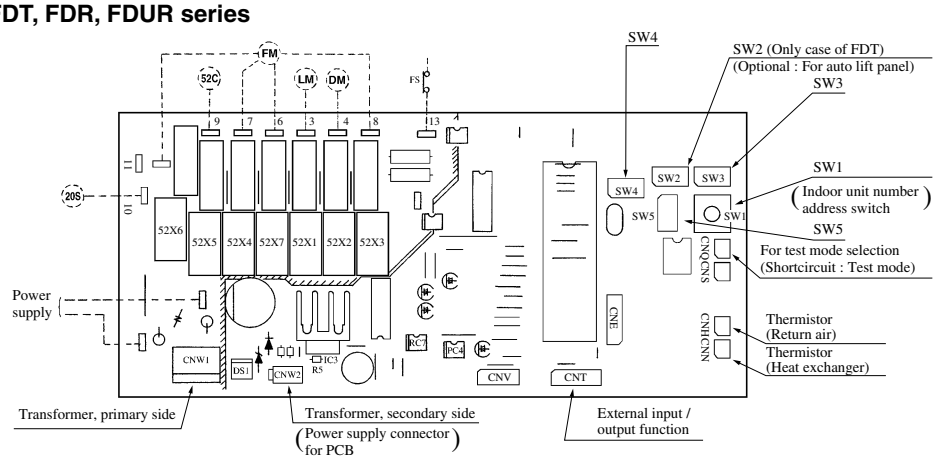
Microcomputer printed circuit board can be replaced with following procedure.

(i) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

| Model | Parts number |
|---|---|
| FDT, FDR, FDUR | PJA505A092Z |

**Parts layout on the indoor unit PCB**

**Model: FDT, FDR, FDUR series**




- Function of DIP switched (SW3)

| Switch | | Function |
|---|---|---|
| SW3-1 | ON | Power off guaranteed |
| | OFF | No power off guaranteed |
| SW3-2 | ON | With low-voltage detection control |
| | OFF | Without low-voltage detection control |
| SW3-3 | ON | Power up mode (UHi-Lo) |
| | OFF | Mild mode (Hi-Lo) |
| SW3-4 | ON | Indoor fan is Lo when heating thermostat is OFF. |
| | OFF | Indoor fan is OFF when heating thermostat is OFF. |

- Function of DIP switched (SW4, 5)

| Switch | | Function |
|---|---|---|
| SW4-1(J1) | ON | Antifrost 2.5˚C |
| | OFF | Antifrost 1˚C |
| SW4-2(J2) | ON | With abnormality resetting |
| | OFF | Without abnormality resetting |
| SW4-3(J3) | ON | 4 position louver control: valid |
| | OFF | 4 position louver control: invalid |
| SW5-1(J4) | ON | 1 Phase model |
| | OFF | 3 Phase model |
| SW5-2(J5) | ON | Step input |
| | OFF | Pulse input |

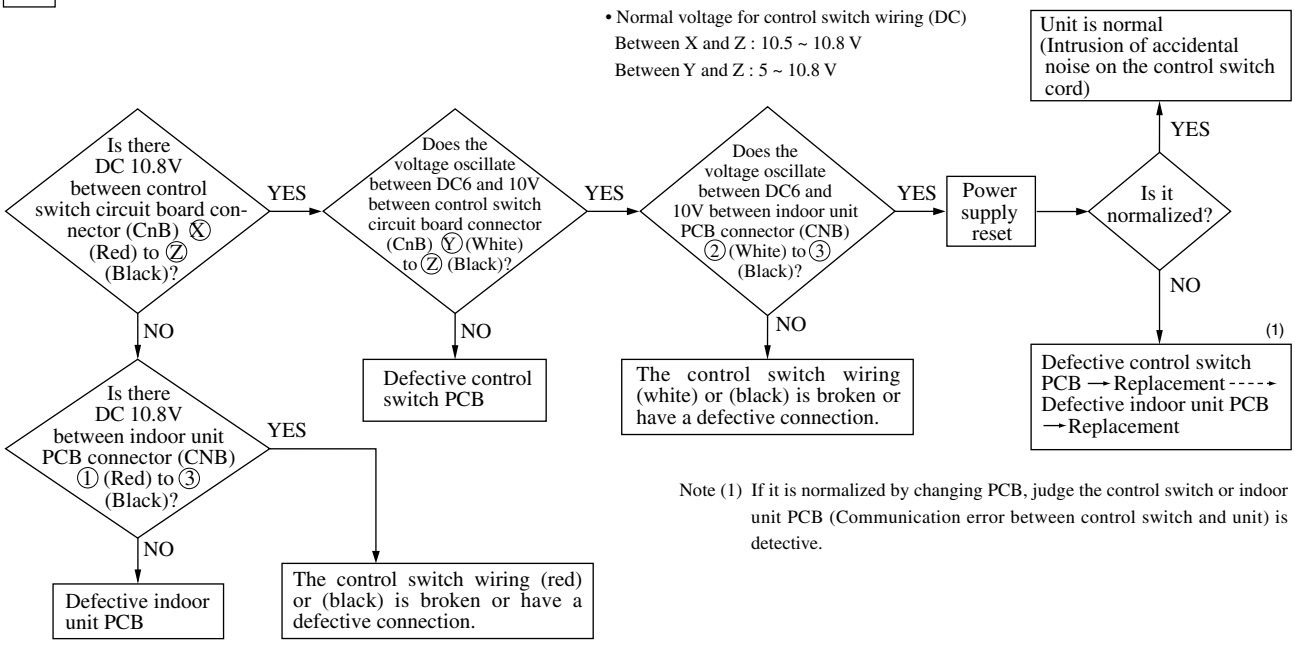
(ii) Please match the settings of control switching switches (SW3, SW4, SW5) to the settings they had before they were replaced. With these switches, if the printed circuit had a jumper wire before being replaced, set to jumper wire ON if there was a jumper wire and jumper OFF is these was not.

(iii) Connect the fast-on terminals and connectors that are to the circuit board for the micro-computer.
Connect by matching the wire color of the fast-on terminal with the color printed on the circuit board for the micro-computer.

Note (1) When connecting to the fast-on connection for the circuit board for the micro-computer, use care so as not to excessively distort the circuit board.

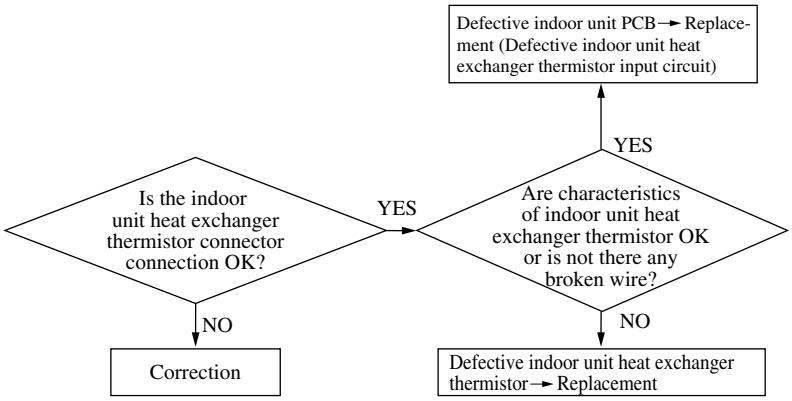
**(c) Inspection method when error code is displayed**

**1** **Error display : E1** **[Communication error between control switch ~ Indoor unit PCB]**

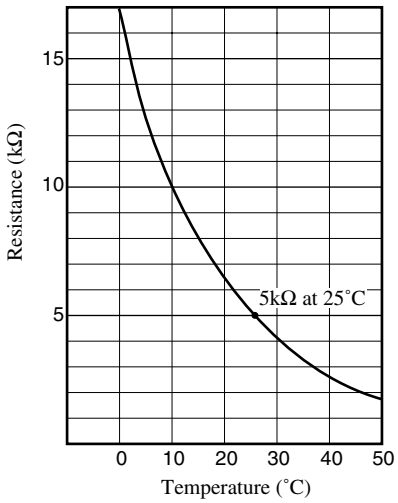

• Normal voltage for control switch wiring (DC)
Between X and Z : 10.5 ~ 10.8 V
Between Y and Z : 5 ~ 10.8 V
Unit is normal (Intrusion of accidental noise on the control switch cord)
Is there DC 10.8V between control switch circuit board connector (CnB) Ⓧ (Red) to Ⓩ (Black)?
YES
Does the voltage oscillate between DC6 and 10V between control switch circuit board connector (CnB) Ⓨ (White) to Ⓩ (Black)?
YES
Does the voltage oscillate between DC6 and 10V between indoor unit PCB connector (CNB) ② (White) to ③ (Black)?
YES
Power supply reset
Is it normalized?
YES
NO
(1)
Defective control switch PCB → Replacement
Defective indoor unit PCB → Replacement
NO
Defective control switch PCB
NO
The control switch wiring (white) or (black) is broken or have a defective connection.
NO
Is there DC 10.8V between indoor unit PCB connector (CNB) ① (Red) to ③ (Black)?
YES
The control switch wiring (red) or (black) is broken or have a defective connection.
NO
Defective indoor unit PCB

Note (1) If it is normalized by changing PCB, judge the control switch or indoor unit PCB (Communication error between control switch and unit) is detective.

## 2 Error display : E6 [Defective indoor unit heat exchanger thermistor]

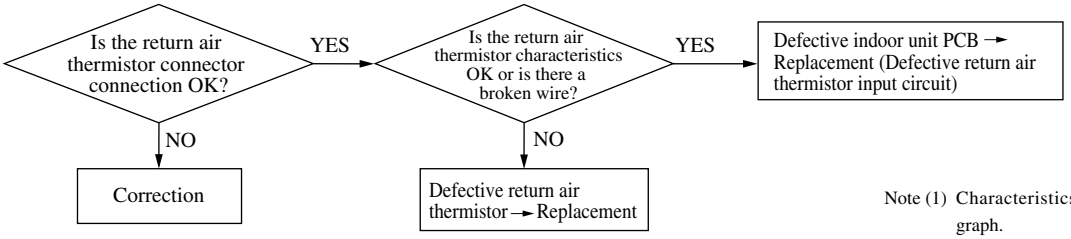

Is the indoor unit heat exchanger thermistor connector connection OK?
YES
NO
Correction
Are characteristics of indoor unit heat exchanger thermistor OK or is not there any broken wire?
YES
NO
Defective indoor unit heat exchanger thermistor → Replacement
Defective indoor unit PCB → Replacement (Defective indoor unit heat exchanger thermistor input circuit)

Return air thermistor ($Th_R$-A)
Indoor unit heat exchanger thermistor ($Th_R$-R)
Resistance temperature characteristics



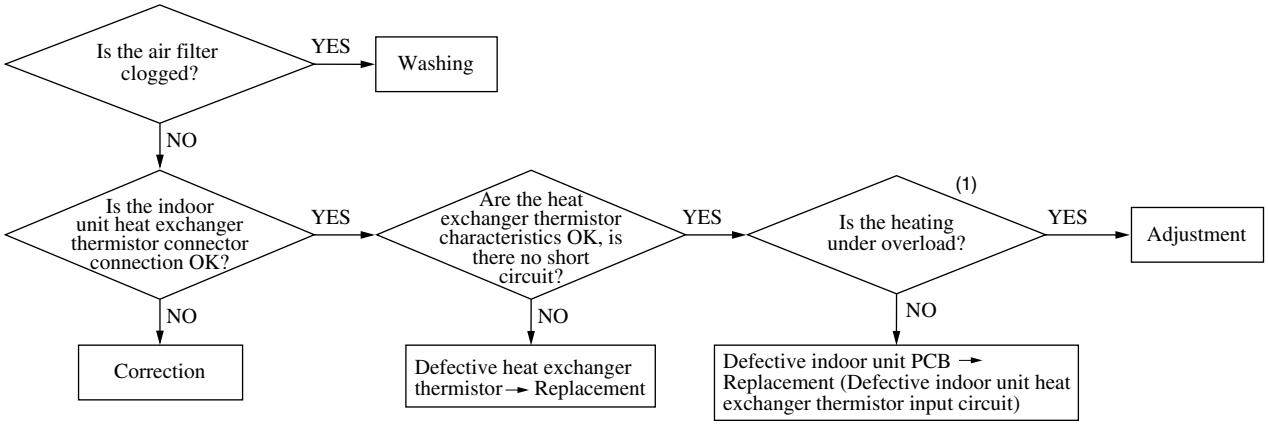

Note (1) 22.5 kΩ at -6˚C

## 3 Error display : E7 [Defective return air thermistor]


Is the return air thermistor connector connection OK?
YES
NO
Correction
Is the return air thermistor characteristics OK or is there a broken wire?
YES
NO
Defective return air thermistor → Replacement
Defective indoor unit PCB → Replacement (Defective return air thermistor input circuit)

Note (1) Characteristics as per the above graph.

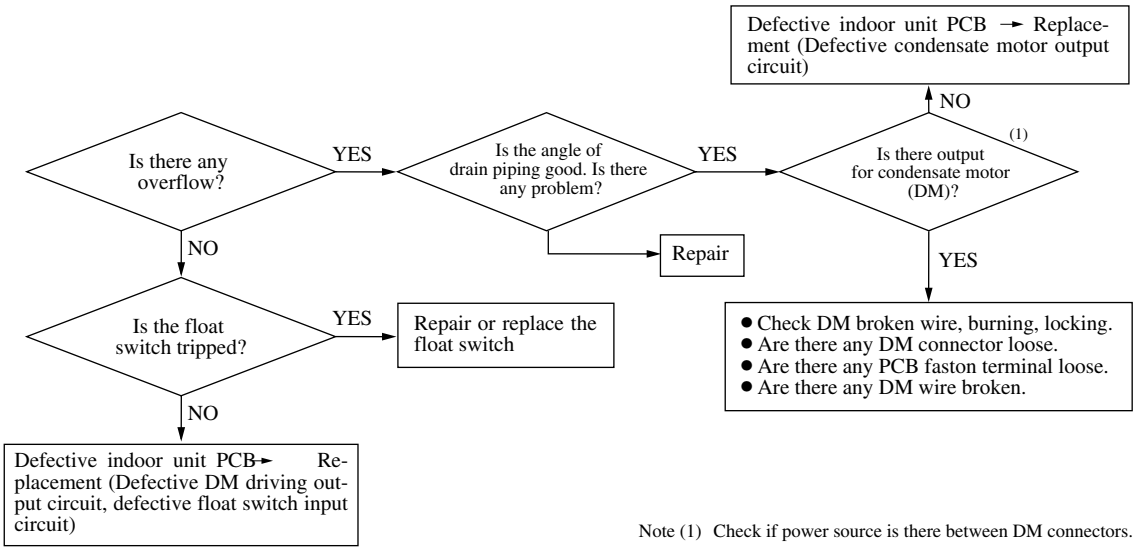
## 4 Error display : E8 [Heating overload]




Note (1) To see whether or not it is over-loaded, check the following:

( ▶ Is the inside/outside air temperature too high?
▶ Is there any short circuit?
▶ Is the refrigerant overcharge? )

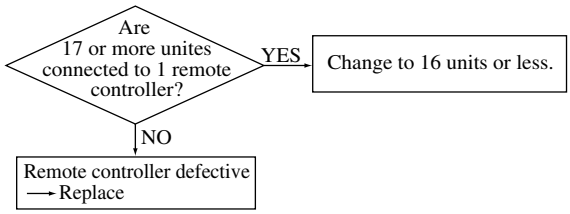
## 5 Error display : E 9 [Failure in drainage]


Defective indoor unit PCB → Replacement (Defective condensate motor output circuit)
NO
(1)
Is there any overflow?
YES
Is the angle of drain piping good. Is there any problem?
YES
Is there output for condensate motor (DM)?
NO
Repair
YES
Is the float switch tripped?
YES
Repair or replace the float switch
NO
● Check DM broken wire, burning, locking.
● Are there any DM connector loose.
● Are there any PCB faston terminal loose.
● Are there any DM wire broken.
Defective indoor unit PCB→ Replacement (Defective DM driving output circuit, defective float switch input circuit)

Note (1) Check if power source is there between DM connectors.

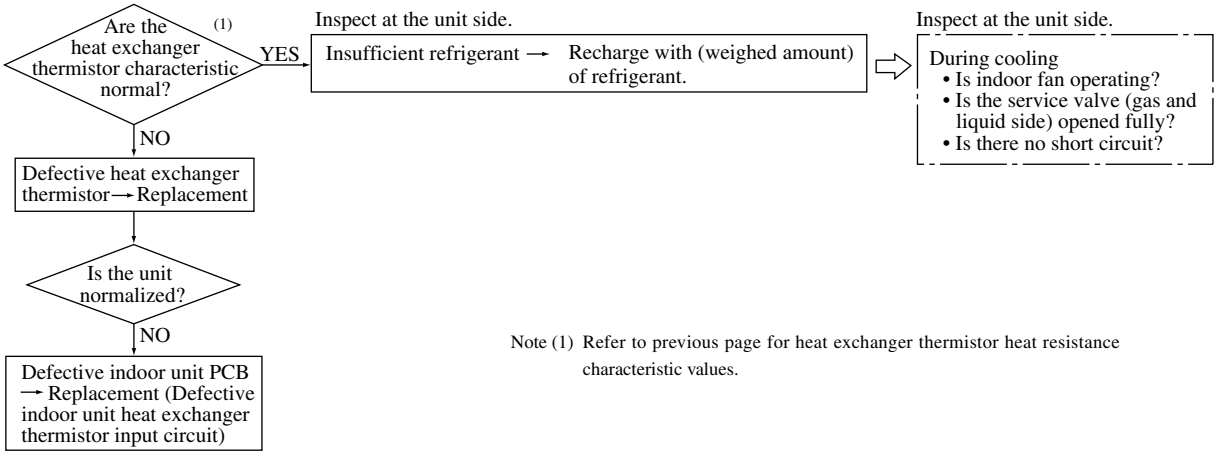
---

## 6 Error display : E 10 [1 Remote controller for multiple unit control Exceeding connected units (17 units or more)]


Are 17 or more unites connected to 1 remote controller?
YES
Change to 16 units or less.
NO
Remote controller defective →Replace

---

## 7 Error display : E 57 [Insufficient refrigerant]


Are the heat exchanger thermistor characteristic normal?
(1)
YES
Inspect at the unit side.
Insufficient refrigerant → Recharge with (weighed amount) of refrigerant.
Inspect at the unit side.
During cooling
• Is indoor fan operating?
• Is the service valve (gas and liquid side) opened fully?
• Is there no short circuit?
NO
Defective heat exchanger thermistor→Replacement
Is the unit normalized?
NO
Defective indoor unit PCB → Replacement (Defective indoor unit heat exchanger thermistor input circuit)

Note (1) Refer to previous page for heat exchanger thermistor heat resistance characteristic values.

### (3) Outdoor unit side

**Check Indicator Table**

Failure mode on the outdoor unit is indicated by flashing both Green LED (LED-G) and Red LED (LED-R) on the printed circuit board.

| Outdoor unit LED | | Failure at: | Contents of the failure |
|---|---|---|---|
| Green | Red | | |
| Keeps flashing | Stays OFF | ———— | Normal/Power is supplied. |
| Stays OFF | 2 time flashes | Installation or operation status | • Over current of the compressor motor.<br>• Open phase at L2 phase (secondary wiring of 52C) of compressor.<br>• Defective outdoor unit PCB. |
| Stays OFF | 3 time flashes | CM wiring | • The wiring (secondary wiring of 52C) to the compressor is open. |
| Stays OFF | 4 time flashes | Installation or operation status | • The outdoor heat exchanger temperature is too high [70°C or over]. |
| | | Outdoor heat exchanger thermistor | • Failure with the outdoor heat exchanger thermistor. |
| 1 time flash | 1 time flash | Outdoor heat exchanger thermistor | • Failure or open circuit with the outdoor heat exchanger thermistor or imperfect connection of the connector. |
| 1 time flash | 2 time flashes | Outdoor temperature thermistor | • Failure or open circuit with the outdoor temperature thermistor or imperfect connection of the connector. |
| 1 time flash | 4 time flashes | Installation or operation status | • The high pressure is too high or it went up (63H1, 49C). |
| 1 time flash | 5 time flashes | Failure to open the service valve | • Closing of the service valve on the liquid/gas side. |

"Check Indicator" is resetted when power supply is turned off once and the failure is fixed.

#### (a) Procedure for diagnosing trouble for outdoor unit

When diagnosing trouble for the outdoor unit, check the flashing and turns of the inspection indicator lamp (red LED) and fault indicator lamp (green LED) to obtain a general concept of the nature of the problem. Then inspect and perform repair.

**1) Unit replacement parts related to printed circuit board for outdoor unit.**

Micro-computer for outdoor unit, microcomputer, printed circuit board, thermistor (heat exchanger, discharge piping and outdoor air), fuses and transformer.

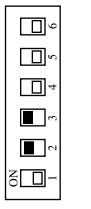
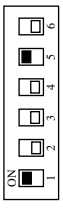
**2) Summary of replacement for micro-computer for outdoor unit**

a) Check the following part number

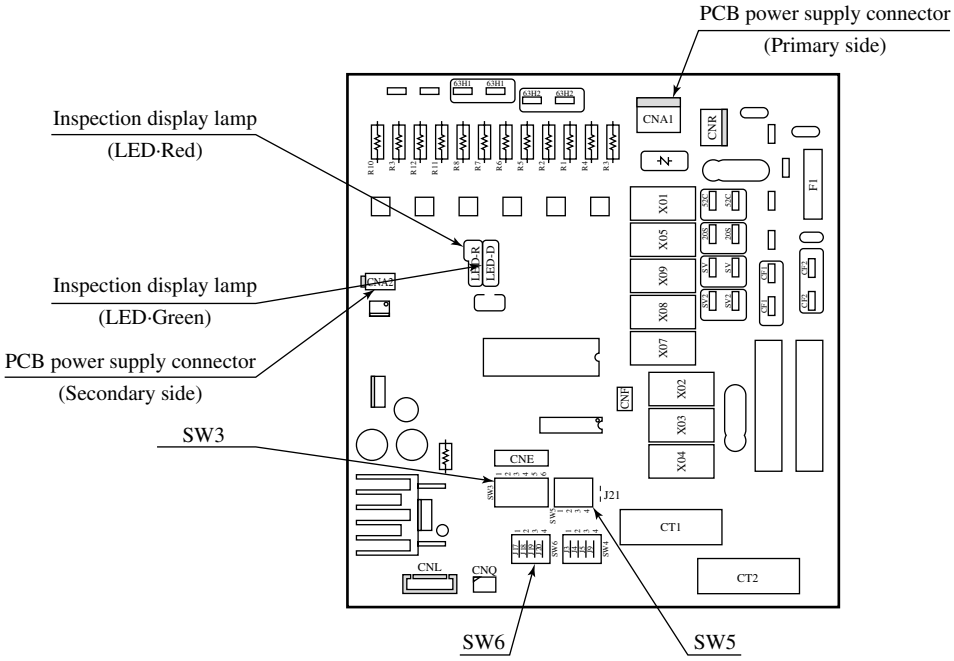
| Model | Parts No. |
|---|---|
| **FDCP808, 1008HES3** | PCA505A046ZD |

b) Set the overcurrent value using the overcurrent setting switch (SW3) for CM. Refer to the following table at the setting.

- **Table of switch (SW3) setting**

| Model | FDCP808HES3 | FDCP1008HES3 |
|---|---|---|
| Setting value (A) | 24 | 34 |
| Table of switch setting<br>Make ON/OFF setting for each switch No.<br>(■: ON, □: OFF) |  |  |

## Parts layout on the outdoor unit PCB




### • Function of DIP switched (SW6)

| SW6 | | Function | |
|---|---|---|---|
| 2 (J18) | ON | Defrost control switching | Normal defrost control |
| | OFF | | Forced defrost control |
| 3 (J19) | ON | 63HI Abnormal detection switching | Enabled |
| | OFF | | Disabled |
| 4 (J20) | ON | 3 minute delay when power is turned on Switching | Enabled |
| | OFF | | Disabled |

### • Function of DIP switched (SW5)

| SW5 | | Function | |
|---|---|---|---|
| 1 | ON | Defrost Switching | Actual spot |
| | OFF | | Ordinary |
| 2 | ON | Snow protection control | Enabled |
| | OFF | | Disabled |
| 3 | ON | Test run Switch | Test run |
| | OFF | | Normal |
| 4 | ON | | Test run for heating |
| | OFF | | Test run for cooling |

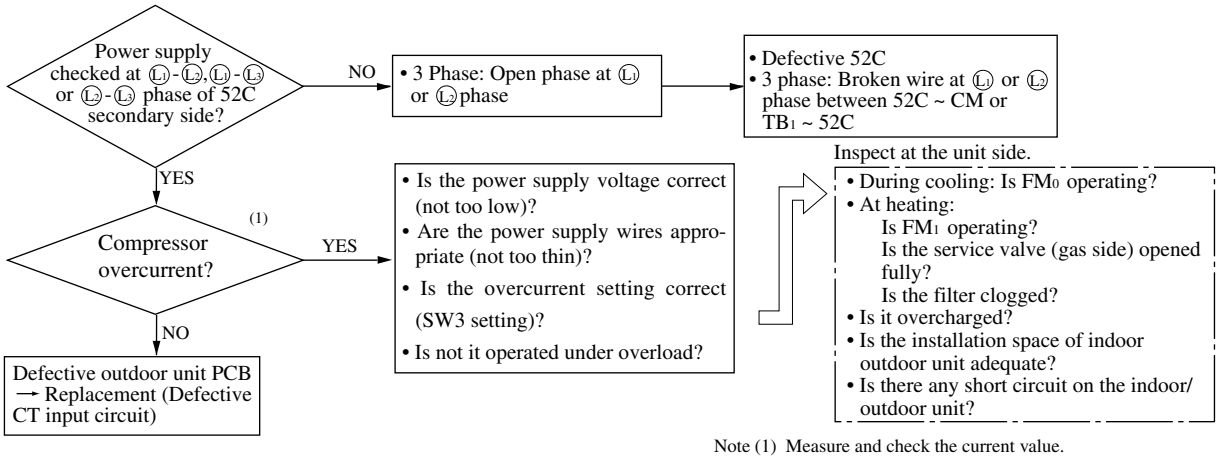
### • Function of jumper wire

| Name | | Function |
|---|---|---|
| J21 | With | Service valve open/close check control enabled. |
| | None | Service valve open/close check control disabled. |

### (b) Inspection method when there are fault lamps (outdoor unit LED)

## 1 Overcurrent of the compressor motor

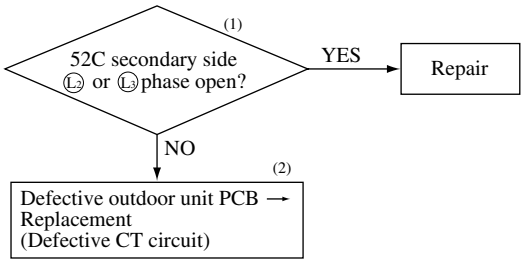
| Outdoor unit | |
|---|---|
| Red LED | 2 time flashes |
| Green LED | Stays OFF |


Power supply checked at L1-L2, L1-L3 or L2-L3 phase of 52C secondary side?
NO
• 3 Phase: Open phase at L1 or L2 phase
• Defective 52C
• 3 phase: Broken wire at L1 or L2 phase between 52C ~ CM or TB1 ~ 52C
YES
(1)
Compressor overcurrent?
YES
• Is the power supply voltage correct (not too low)?
• Are the power supply wires appropriate (not too thin)?
• Is the overcurrent setting correct (SW3 setting)?
• Is not it operated under overload?
NO
Defective outdoor unit PCB → Replacement (Defective CT input circuit)
Inspect at the unit side.
• During cooling: Is FM0 operating?
• At heating:
Is FM1 operating?
Is the service valve (gas side) opened fully?
Is the filter clogged?
• Is it overcharged?
• Is the installation space of indoor outdoor unit adequate?
• Is there any short circuit on the indoor/ outdoor unit?

Note (1) Measure and check the current value.
Confirm that the overcurrent setting by SW3 of outdoor unit PCB is correct.

## 2 The wiring (secondary wiring of 52C) to the compressor is open.

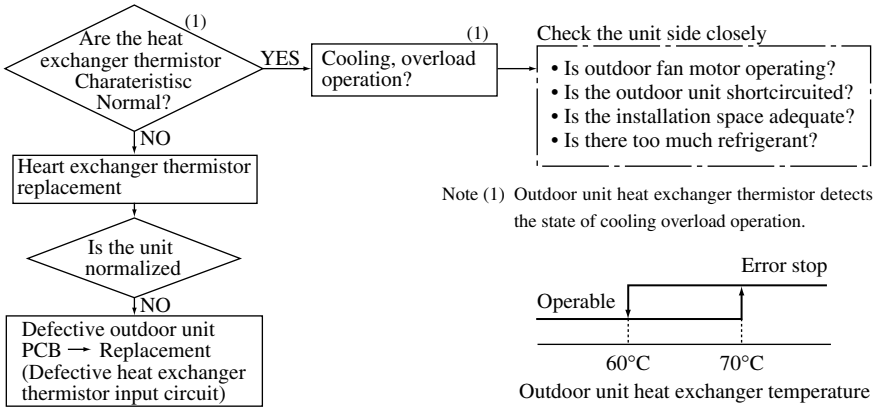
| Outdoor unit | |
|---|---|
| Red LED | 3 time flashes |
| Green LED | Stays OFF |




Notes (1) When voltage is detected at 52C primary side L2 or L3 phase but not at the secondary side, check also 52C (broken coil, poor contact).
(2) When voltage is detected at 52C primary side L2 or L3 phase and there is no error at 52C (52C is energized if $TB_1$ L2 or L3 terminal and 52C coil secondary side connector are short circuited), the outdoor unit PCB (defective $X_{01}$ circuit or $X_{01}$).

## 3 The outdoor heat exchanger temperature is too high (70°C or over)

| Outdoor unit | |
|---|---|
| Red LED | 4 time flashes |
| Green LED | Stays OFF |


(1)
Are the heat exchanger thermistor Charateristisc Normal?
YES
(1)
Cooling, overload operation?
Check the unit side closely
• Is outdoor fan motor operating?
• Is the outdoor unit shortcircuited?
• Is the installation space adequate?
• Is there too much refrigerant?
NO
Heart exchanger thermistor replacement
Is the unit normalized
NO
Defective outdoor unit PCB → Replacement (Defective heat exchanger thermistor input circuit)

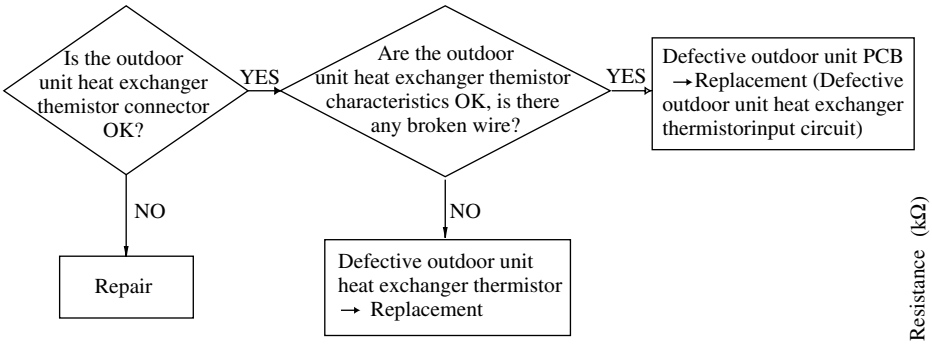
Note (1) Outdoor unit heat exchanger thermistor detects the state of cooling overload operation.

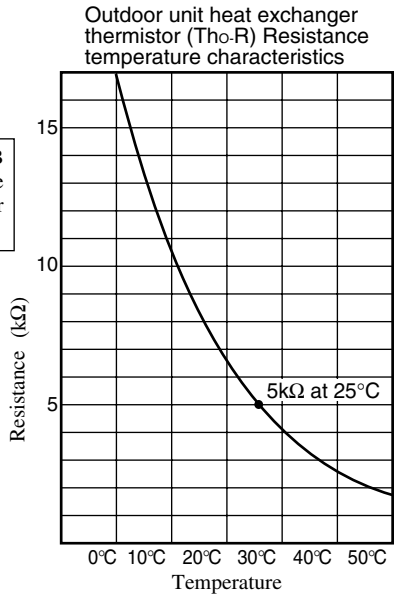



Outdoor unit heat exchanger temperature

## 4 Defective outdoor unit heat exchanger thermistor

| Outdoor unit | |
|---|---|
| Red LED | 1 time flash |
| Green LED | 1 time flash |

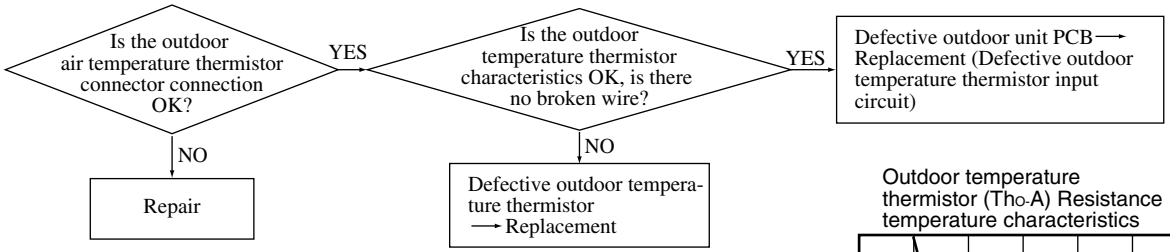

Is the outdoor unit heat exchanger themistor connector OK?
YES
Are the outdoor unit heat exchanger themistor characteristics OK, is there any broken wire?
YES
Defective outdoor unit PCB →Replacement (Defective outdoor unit heat exchanger thermistorinput circuit)
NO
Repair
NO
Defective outdoor unit heat exchanger thermistor → Replacement

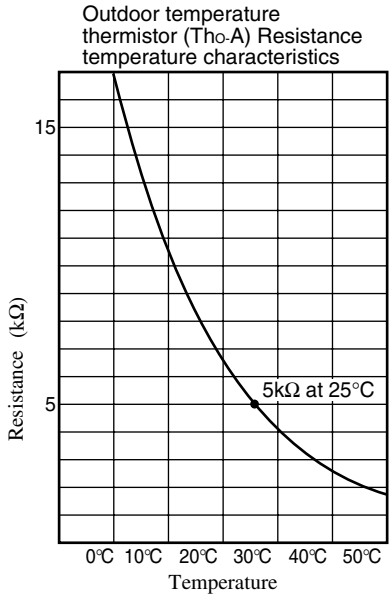



Note (1) 22kΩ at -6°C

## 5 Defective outdoor temperature thermistor

| Outdoor unit | |
|---|---|
| Red LED | 2 time flashes |
| Green LED | 1 time flash |

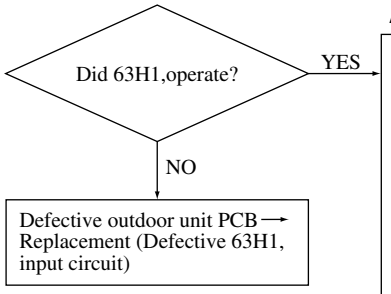

Is the outdoor air temperature thermistor connector connection OK?
YES
Is the outdoor temperature thermistor characteristics OK, is there no broken wire?
YES
Defective outdoor unit PCB⟶ Replacement (Defective outdoor temperature thermistor input circuit)
NO
Repair
NO
Defective outdoor tempera-ture thermistor ⟶Replacement




Note (1) 22kΩ at -6°C

## 6 63H1, 49C operation

| Outdoor unit | |
|---|---|
| Red LED | 4 time flashes |
| Green LED | 1 time flash |




**At 63H1 operation**

**1. During cooling**
- Is the outdoor unit fan motor operating?
- Is there no short circuit air circulation for thr outdoor unit?
- Is there sufficient space for air inlet & outlet?

**2. During heating**
- Is the gas side service valve fully opened?
- Is the indoor unit heat exchanger thermistor detached from the detector case?
- Is the filter clogged?
- Is the outdoor unit fan controlled by due to defective 63H2?

**3. During colling/heating**
- Is the refrigerant overcharge?

**At 49C operation**

**During cooling/heating**
- Isn't there insufficient refrigerant? (Isn't there gas leakage?)
- Isn't there a missing phase (Ⓛ1 or Ⓛ2 phase)?

## 7 Failure to open the service valve

| Outdoor unit | |
|---|---|
| Red LED | 5 time flashes |
| Green LED | 1 time flash |

This abnormality will be indicated only when the compressor is ON for the time after turning on the power. (Refer to page 51)

# MULTI-SPLIT SYSTEM
# ROOM AIR-CONDITIONER

MITSUBISHI HEAVY INDUSTRIES, LTD.

Air-Conditioning & Refrigeration Systems Headquarters

3-1, Asahimachi, Nishibiwajima-cho, Nishikasugai-gun, Aichi-pref., 452-8561, Japan

Fax: (052) 503-9237